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SURGICAL TREATMENT OF TOXIC GOITER*

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The surgical treatment of toxic goiter differs from that of the ordinary non-toxic in several ways. First, the indications for operation are quite different, and, secondly, the dangers of the operation lie mainly in other directions, while the technic of itself is more or less the same.

As to the indications for operation, we must remember that toxic symptoms can occur in any form of thyroid, even in malignant ones. A large colloid goiter may become toxic secondarily. After it has existed for years as an inert, or at least apparently inert, goiter, toxic symptoms become gradually quite marked and even exophthalmos develops. In such a case the goiter as a mass compressing the trachea or as an unsightly disfiguration of the neck, or damaging the recurrent laryngeal nerves or even as a substernal or intrathoracic tumor, may add to the desirability or necessity of surgical interference. While the thyroid which develops primarily into a toxic exophthalmic condition was called by Kocher *Struma Basedowiana,* the thyroid which, after having reached an outspoken inert goitrous enlargement and having existed for perhaps many years, now becomes secondarily toxic with protrusion of the eyes, was called *Struma Basedowificata.* An inert pre-existing goiter thus may become toxic at a later date. The indications for operation are in this case of course doubly strong, as the patient must be relieved from the toxicity as well as from the mechanical disturbance.

We divide nowadays the toxic forms mainly into two groups, the non-exophthalmic forms, most frequently caused by an adenomatous goiter, and the classical exophthalmic goiter. The rigid adherence to this differentiation of the toxic goiters does not seem justified. One will observe non-adenomatous diffusely enlarged goiters of very toxic character without exophthalmos, as well as on the other side exophthalmic goiters with multiple nodes. This latter form is seen most frequently in countries with numerous and large endemic goiters. The toxic parts in the gland in these latter forms may be between the colloid nodes, a fact which the surgeon must have in his mind. Time does not allow me to follow this line of thought much longer, but an *a priori* reasoning tells you that the more a node is colloid the more it is inert and the less it can be toxic. The toxic adenoma is something quite different from degenerating and dilapidating colloid nodes, which should not be called adenomata, but rather foci of (secondary) colloid degeneration. These latter do not have a clear-cut capsule.

In great contradistinction to these nodular areas of colloid degeneration is the true adenoma of active growth. It is very cellular and grows within itself. It starts somewhere in the parenchyma, which is then gradually pushed away and becomes thus compressed and stretched out. The stroma in this surrounding parenchyma remains and forms a capsule for the adenoma, from which it is readily shelled out, while the epithelial elements disappear more or less completely. This active adenoma was recognized by the analytical mind of Plummer to be at the bottom of the bulk of the toxic non-exophthalmic goiters. The surgeon should remember therefore that in these cases it is the adenoma itself which causes the toxic symptoms, while in a colloid goiter which becomes toxic later, it is mostly the remaining thyroid tissue between the colloid nodes which is the source of the toxic phenomena. He can remove these colloid nodes with far advanced degeneration to his heart's content, as long as he leaves some functioning parenchyma near the capsule and especially at the upper horn.

The signs of toxicity are an abnormally active circulation in the gland, which announces itself by a buzzing and whirring under the stethoscope

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and an arterial thrill to the palpating finger, especially over the superior thyroid vessels. The gland as a whole is very much more vascular than the normal gland, and expands on pulsation in toto.

For the surgeon it is of prime importance to know the degree of toxicity with which he has to deal. Fortunately we have good indicators. The pulse rate is a most valuable means to judge the gravity of the case. If it is 120 at complete rest, it will shoot up way beyond 140 and 160 as soon as physical exertion or especially psychic excitement is added. The degree of tremor is also important; but the most accurate measurement of the degree of toxicity is given us by the examination of the rate of basal metabolism. From plus 15 on, the rate is considered abnormal; but it would seem that in the presence of a very small thyroid and no marked clinical symptoms except an outspoken nervousness one should not be too prompt with the advice of surgical measures. We have only once operated for toxic symptoms with a metabolism of less than 20; and then only because (without the administration of iodin) the metabolism remained around 18 or 20 at long intervals and in the meantime no improvement could be reached by medication.

Let us hope that soon simpler and non-surgical measures will be found to cure these cases. Iodin will of course very probably bring the metabolism down, but as this is not curative and gives only a temporary improvement, we never use it except in the preparation of the patient for operation. In a case of doubtful indication for operation it will blur the issue and, what is more important, it is liable to do harm if given for any greater length of time. The thyroid in a susceptible case inclined to hyperthyroidism may become stimulated by protracted iodin treatment and what is termed iodin-thyroidism results. If the case then becomes surgical, one cannot use iodin in its preparation, and the one means which has improved the operative results wonderfully is unavailable. It is necessary to warn against the promiscuous use of iodin in toxic goiters. I would much rather operate on a severe case of exophthalmic goiter which I can prepare for from 3 to 5 or 7 days in the hospital with rest in bed and a sign "no visitors" on the door and 15 drops of Lugol's solution three times a day, than on a case which does not look as severe but has had iodin for weeks.

Hyperthyroidism in an outspoken form is a surgical disease. And although some of my internal colleagues will take issue with this statement, let me say that if one wants to do the right thing in a marked toxic goiter the case ought to be handled from the beginning by, or at least in conjunction with, the prospective surgeon, who will be anxious to watch closely the change in the metabolic rate under a short but energetic iodin administration. I dread the cases that have had iodin for weeks without control of their metabolic rate. As soon as a marked drop occurs in the rate after a few days of iodin treatment, in other words, when the condition has definitely entered into a decreasing phase, we may operate radically even with a metabolic rate which would have been prohibitive before we knew of the preparatory iodin treatment of these patients. With this temporary drop in the rate we have repeatedly performed thyroidectomy though the metabolism was still plus 60 or 70 or more.

But as much as the death rate from hyperthyroidism has fallen on account of this splendid improvement in the preparation of the patient for operation, we still have to face very critical situations. For example, in one case we had to do a thyroidectomy in the presence of a metabolic rate of plus 125. It was a recurrent toxic goiter. I am not sure that this case would not have been lost without the help of iodin administration. In another very recent case the pulse went up to 186 on the operating table and stayed there during the operation. It was a woman who had shown great variability in her pulse rate, and further delay seemed of no benefit. Even in the narcosis, which was however very light, the inner excitement kept on, and a rapid radical operation seemed to give the best chance. It was a non-exophthalmic case, and iodin, tried in small doses before operation, did not appear to act well. Our hope rested on two observed facts: (1) the metabolic rate had come down from plus 53 to 40.5 and (2) the pulse under complete rest had been within reasonable limits (90 to 110). Nevertheless this was an extreme limit to which to go, and only the fact that prolonged pre-operative treatment had not yielded a better state of affairs could justify active procedure.

Crile's anoci-association would have been best in this case. It was followed in an imperfect way only. To do it to perfection the whole hospital staff has to be especially trained.

In toxic adenoma iodin is not advocated and has the tendency to aggravate the toxic symptoms. This also, I find, is not always the case. If it is used in an atypical case, it must be tried with the utmost care. Unfortunately a simple ligation of one or more thyroid arteries does no good in these forms either, and is very liable to make things worse. In an extreme case of exophthalmic goiter ligation has its place, but since we know of the wonderful effect of the preparatory iodin administration under the control of the metabolic rate, ligation has become a very rare procedure with us. In 1904 I published my first five cases of operation for Graves' disease. Four of these were treated by ligation of three thyroid arteries only. While all had good primary results, one of them later did not seem to do well, moved to Colorado and was lost sight of. Two which were ligated and the resected case remained well for many years as we had news from them; in fact one of the ligated ones in which the operation dates back twenty-nine years was reported not long ago as well. Another ligated case, my first one, operated upon in 1896, with extreme exophthalmos, was well, though never very robust, for twenty-three years, then all at once became acutely toxic again with the heart running wild. We performed a thyroidectomy, but the patient died of hyperthyroidism. It was before the introduction of the preparatory iodin treatment.

As to the technic we can be brief. It does not differ materially from the operation for ordinary non-toxic goiters. In the ligation operation the upper thyroid arteries are usually selected or the whole upper pole is tied off. If the incisions are exactly in the line of the natural skin folds and if they are closed by subcuticular fine catgut or skin clips which are removed and replaced by a strip of collodion gauze after forty-eight hours, the scars will be very little visible. One may make a low collar incision, especially if the operation is done under an anesthetic, and from here ligate both upper poles. At the time of the thyroidectomy later on one can then use the same place for the skin incision and thus avoid multiple scars.

For the thyroidectomy local anesthesia (with a previous hypodermic of one-sixth or one-quarter grain of morphine) is chosen by us in those cases where the thought of operation does not excite the patient too much; but even here it is often better to give a little gas during the luxation of the goiter. Ether is to be avoided if possible. However, in case of marked nausea from novocain it is perhaps not widely enough known that a few whiffs of ether act as a specific antidote. Dexterity and experience are of course important, but rapidity should not be at the expense of undue loss of blood or at the sacrifice of carefulness.

While in large colloid goiters we must think constantly of leaving a sufficient amount of reasonably normal thyroid tissue, one can go very far in the resection of toxic goiters as long as one leaves a little tissue at the upper poles and the posterior capsule to protect the parathyroids. Even very small remnants consisting of one-sixth or even one-tenth of the gland are here sufficient; in fact the promptness and completeness of the cure are in direct proportion with the extent of the resection. I have never removed too much, but several times not quite enough. In non-toxic goiters one can quite often get along with a simple median vertical splitting of the fascia, but in the toxic forms we prefer to add as a rule a horizontal cutting of fascia and muscles in the upper wound area. This allows us to handle the gland with greater gentleness. An increased firmness and dryness of the loose connective tissue directly surrounding the goiter, this dry perithyroiditis is characteristic of the toxic cases. At times when the goiter is freed with the finger, one can hear a noise as if made by crumpling of fine tissue paper. The gland itself is felt as hard and somewhat rigid. It is friable and breaks readily on grasping with an artery forceps. The vascularity is not only great but the vessels are rather frail.

In our work we had always more respect for the lateral veins than some surgeons think necessary. An absolutely dry field in laying the goiter free allows one to recognize the structures properly. Most all the books on anatomy give transverse sections of the neck in which the deeper fascia envelops the sterno-hyoid and sterno-thyroid muscles thoroughly. This fascia is well developed over the outer surface of these

muscles but posteriorly you will mostly find very little of it. The sterno-thyroid muscle is so flatly spread over the goitrous gland that it has to be freed very carefully from the thyroid; otherwise one always leaves a few bundles of muscle fibres and loses the proper line of cleavage, which results in a blurred picture of the anatomy. For those who are not outstandingly dexterous (and among them I find myself) it is perhaps the neatest procedure to first free the goiter on both sides rather thoroughly and to make sure of the location of the trachea before one begins with the resection of the gland. In this way one is more sure of remaining master of the situation, should bleeding or choking become serious.

In a case where the lobes are pretty well separated or where the isthmus is not particularly bulky, and where the condition of the patient appears too grave for a complete resection, one may resect one side only. While this becomes necessary at times in an extreme case of large colloid goiter with dyspnea as a conspicious feature, I have never made a two-step hemithyroidectomy in toxic goiters if my memory serves me right. But perhaps in some cases it would have been better had I made the resection in two steps.

For the hemostasis of the remaining portion of the thyroid a running catgut suture is very satisfactory. The separate ligation of the inferior thyroid artery seems very rarely done in this country. The larger vessels, arteries and veins, are secured by one or two lock stitches around the outer side of the artery clamps which hold them. Thus as a rule not even the superior arteries are tied separately. After firmly securing with the lock stitch it is good policy to pierce the vessel with the running suture to keep it from slipping away. When the suture is finished, the patient is ordered to cough, or if he was under a general anesthetic he is allowed to come to enough so that he strains. Any bleeding is carefully taken care of. On straining, the central ends of the veins may bleed if they were not well secured before.

In our 675 goiter operations for all kinds of goiter we never had to leave clamps nor were we forced to re-open the wound to look for an active hemorrhage, but in goiter surgery one is at times walking on thin ice and the morrow may bring sorrow to the surgeon.

We had eleven deaths in our goiter work, including malignant, stenosing and intrathoracic cases, a mortality of 1.63 per cent. What then were the causes of death? In one case of an enormous non-toxic goiter, softening and collapse of the trachea had forced us to use intubation after the patient was returned to her bed. The tube had to be left in the trachea for several days, as removal was always followed promptly by alarming dyspnea. A bronchoblennorrhea set in, which the greatly run down patient was not strong enough to cope with. All the other ten deaths were from hyperthyroidism, every one dating back to the days before Plummer had given us the preparatory iodin treatment under the control of the metabolic rate. In our last 218 goiter operations performed in the last three and a half years, there was no mortality. Among them were 143 toxic goiters and among these there were only four ligations and no other two-step operations.

POISONOUS EFFECTS OF OXYGEN

In animal experiments a concentration of oxygen of more than 70 per cent of one atmosphere may produce symptoms of oxygen want. The manifestations are drowsiness, anorexia, loss of weight, dyspnea, cyanosis and, finally, death. Postmortem examination showed that diffuse hemorrhagic edema had developed, with such injury to the diffusion membrane of the lung that, in spite of the increased head of pressure, the arterial blood remained unsaturated. With this knowledge of the effects of overrich oxygen mixtures, oxygen may be used to greater advantage therapeutically. (Jour. A. M. A., May 14, 1927, p. 1570.)

INJECTION TREATMENT OF VARICOSE VEINS

In the face of growing enthusiasm for the treatment by injection of varicose veins of the leg and hemorrhoids, it is well to consider a recent report of a death after injection treatment of varicose veins. A man, aged 60, who had dilated veins of the left leg, was treated at short intervals with five injections of a 20 per cent sodium chloride solution. Serious symptoms developed, but the patient overcame these. However, about one month after the injection treatment he died suddenly of embolism of the pulmonary artery. One case proves nothing, but one disaster is an indication for caution. (Jour. A. M. A., May 14, 1927, p. 1571.)

DIAGNOSIS AND MEDICAL TREATMENT OF TOXIC GOITER*

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There are two forms of toxic goiter—toxic adenoma and exophthalmic goiter. Toxic adenoma is always preceded by a simple adenoma. Exophthalmic goiter is a disease of young people while toxic adenoma begins to show symptoms at about the age of thirty-eight. A toxic adenoma may be mixed type, containing areas of hyperplasia as well as the adenoma. When this is understood, one can see why a patient with a toxic adenoma will improve, temporarily at least, under Lugol's solution.

The diagnosis of toxic goiter is very simple if the prominent symptoms are present. A patient with a goiter who is nervous and has palpitation on exertion has a toxic goiter. Then in addition, if there is a history of sweating easily with fatigue and sleeplessness along with an increase of the basal metabolism, the diagnosis is complete. Sweating suggests a hyperfunction of the thyroid gland more often to me than any other symptom. While the diagnosis of the striking cases seems so easy, we must not forget it is very easy to overlook a large substernal goiter unless one is examining the patient especially for this condition. While I was writing this article, I operated upon a goiter that showed quite a large mass on the right side and in the region of the isthmus. Before operation I thought this was the full extent of the goiter, but when I removed the large right lobe and the isthmus, I then found to my surprise on the left side a broad left lobe extending well down below the sternum which was not palpable before the operation.

The milder forms of toxic goiter are much more difficult to diagnose than the more severe cases. Last summer while I was working over the diagnosis of what later proved to be a case of toxic adenoma, I met Dr. Eugene Riggs and he said, "Doctor, I have learned more medicine in the last month than ever before in my life, in the same length of time." Then he went on to tell me that some of these cases that he had been treating for neurasthenia, with palpitation, restlessness, insomnia, etc., were cases of toxic goiter. He now feels that he is going to be able to clear up some of these indefinite cases where formerly he failed.

The case that was uppermost in my mind when I talked to Dr. Riggs has been under my observation off and on for ten years. I first saw him with a tuberculous epididymitis and later with an auricular fibrillation. We then found that he had some badly abscessed teeth. After these were removed, with rest and digitalis, he was well again. His last illness began with attacks of restlessness, and melancholia. He slept well but was unable to concentrate on his work. If he was at home he wanted company—anything for excitement. His heart was irregular, rapid, and somewhat enlarged. He complained of being hot in the house when the rest of the family were comfortable or cold. He complained of sweating easily. There was a slightly palpable thyroid gland which at first we overlooked. He entered the hospital with a diagnosis of chronic myocarditis. The first night in the hospital he did not sleep, although he had received luminal and veronal. He said that he was so depressed that he thought of jumping out of the window. Then we thought we might be dealing with a psychosis. His basal metabolism was plus 56. After he was in the hospital for two months with Lugol's solution off and on, we operated upon him and found a small adenoma. His recovery has been gradual, for he is still nervous. Four months after the operation his basal metabolism was plus 11. His nervous system is improving rapidly.

Goetsch feels that many patients who are considered border-line nervous cases with symptoms greatly resembling mild hyperthyroidism, with asthenia, psychasthenia, incipient tuberculosis, etc., are actually suffering from a true thyroid disorder amenable to thyroid surgery.

I asked Dr. E. Mendelssohn Jones what he considered the most important thing in the surgery of a toxic goiter, and he said the pre-operative medical care. I can subscribe to this opinion completely. Once the patient is properly prepared, the operation is usually not very difficult. I have in mind now a case of a little girl about fourteen years old. The diagnosis of exophthalmic goiter could be made at a glance because

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she had a rather prominent goiter with extreme exophthalmos. We put her to bed but she could retain no food, not even water. She had been having a diarrhea for a few days. The pulse was very rapid, and she was very weak. Ten drops of Lugol's solution three times a day stopped the vomiting. The diarrhea was soon under control. It took about two weeks before she was in shape to be operated upon. The basal metabolism was plus sixty. This girl stood the operation well and went home in one week.

Charles Lyman Greene taught me that the deodorized tincture of opium in doses from fifteen to thirty drops three times a day was the best thing to quiet down an irritable heart. We use that as a routine now in toxic goiters. Ice to the heart and head quiets these patients and is very beneficial.

The basal metabolism is not always a reliable index because it may be normal. Strouse and Binsuanger in the Journal of the American Medical Association, January 1927, have reported a small series of cases of what they call the symptom complex resembling hyperthyroidism without increased metabolism. They say that the clinical picture presented by these patients was similar to, if not identical with, the syndrome long known and described by various authors under the names of irritable heart, effort syndrome, neurocirculatory asthenia, etc. They say all these patients have small goiters and a normal metabolism. They used iodine therapy and the patients were benefited or cured.

Since Plummer came out with his work on iodine insufficiency we have been giving Lugol's solution to all adolescent goiters. We give Lugol's solution in small doses of ten drops a day every other week. We have not had a case that did not react to this treatment, and if this continues it may change the goiter problem completely in the future. The other class of cases that show slight symptoms of Graves' disease, also react wonderfully well to the compound solution of iodine. Many times the goiter disappears entirely, and the heart rate comes down to normal, and the patients say they feel perfectly well. We are now less afraid of Lugol's solution and are giving it in larger doses but watching the patients carefully.

Dr. Noble Wiley Jones of Portland, Oregon, reports three cases of rapid heart and nervousness with a normal basal metabolism where the superior thyroid arteries were ligated and a portion of the gland removed with a complete cure of the heart condition. This is really an exploration of the thyroid gland. Dr. Robert Earl reports a similar case where the patient was in the hospital three months before the operation was performed. This patient was operated upon, the superior thyroid arteries being ligated, with complete cure.

In toxic goiter the heart is more seriously involved than any other organ in the body. There is degeneration of the liver, the brain, the kidney, and certain organs of internal secretion, but the heart suffers the most. The heart in a patient with a toxic adenoma shows a myocardial degeneration. In the late stages the heart is often irregular and enlarged. The prognosis in these cases depends almost entirely upon the heart. We are not so much concerned about left-sided enlargement of the heart as we are of right-sided hypertrophy. Kovach taught us that dullness beyond the middle of the sternum to the right showed right heart enlargement. It is the right heart that determines what a patient will stand in operative interference. Once the right heart is enlarged it never returns to normal.

Grant is authority for the statement that it occasionally happens that patients are treated for heart disease for a considerable length of time before it is discovered that a goiter is the cause of the cardiac symptoms. Bartlett says that a history of tachycardia on excitement should suggest hyperthyroidism because the other clinical symptoms may be lacking on examination. He also states that an increase of pulse pressure is pathognomonic of exophthalmic goiter.

Since Plummer has introduced the iodine treatment of exophthalmic goiter, I have not had a case where we had to do a preliminary ligation. In Rochester they do only one ligation now where they did one hundred before they started to use Lugol's solution.

If two selective operations have to be done on the same patient and one is for goiter, do the goiter first.

In the light of what we now know of focal infection, it should not be necessary to emphasize the fact that all foci of infection should be removed in goiter patients. In Rochester they do the major operation first and remove the foci of infection later.

In Bartlett's clinic there are to be no operative procedures under these conditions: (1) Mental derangement; (2) loss of weight; (3) extreme restlessness; (4) cardiac decompensation; (5) metabolic rate very high; (6) vomiting; (7) diarrhea.

PRE-OPERATIVE MEDICAL CARE

Patients with exophthalmic goiter or toxic adenoma may be prepared at home, but most cases do better in a hospital. Very often these patients do better in a ward than they do in a private room. We keep them absolutely quiet in bed. The first basal metabolism is not taken till the second day. From the beginning we give one and one-half grains of sodium luminal by hypodermic t.i.d. with five grains of veronal at night. Fifteen drops of Lugol's solution is given in milk three times a day. In very toxic cases the element of time is very important, but in ten days we should have the maximum benefit of the Lugol's solution. As much as thirty to forty drops of Lugol's solution can be given three times a day. Bartlett gives his patients four doses of veronal, five grains at a time every six hours, starting at noon the day before the operation. He gives no morphine before the operation if he is going to use ethylene, but he does give one one hundred and fiftieth of a grain of atropin sulphate three-fourths of an hour before the operation. In this way he says the patient takes very much less gas and novocaine.

If a patient is taken to the operating room and seems nervous and excited, do not operate that day. Later the patient may be perfectly reconciled to the operation and show no evidence of nervousness.

EFFECTS OF CINCHOPHEN

Cinchophen is not directly depressant to the heart muscle. The circulatory collapse produced by the toxic doses is due to effect on the vagus and vasomotor centers. It occasionally produces local irritation in the digestive tract, as indicated by anorexia, nausea, and other digestive disturbance. There may be scarlatiniform, urticarial or purpural skin eruptions, and edema with fever. In large doses it may produce albuminuria, though less so than salicylate. The administration of sodium bicarbonate is believed to lessen gastric irritation. A liberal amount of water should always be given along with cinchophen. The use of neocinchophen obviates the gastric irritation and lessens the possibility of toxic effects. (Jour. A. M. A., May 14, 1927, p. 1586).

THE PATHOLOGY OF TOXIC GOITER*

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Toxic goiter, from a pathologic point of view, is divided into two classes, the exophthalmic goiter and the toxic adenoma. The exophthalmic goiter is the thyroid gland which is slightly or moderately but rarely markedly enlarged. It is usually symmetrical in shape, pale in color, very firm in consistency with a "fleshy" or "meaty" appearance. It is homongeneous throughout with no cysts or adenomata but occasionally it is divided into segments by delicate fibrous septa. The microscopic sections show it to consist of acini lined by high, columnar, deeply staining epithelium which is thrown into papillary-like folds projecting into the lumina, which contain no colloid. At various points throughout the gland there are accumulations or foci of lymphocytes. In addition to these hyperplastic acini there may or may not be other acini which are filled with colloid and lined by low cuboidal epithelium, but these are never as numerous as the other type. Such is the typical picture of an exophthalmic goiter but great variations are seen. The degree of hyperplasia in the gland is not at all analogous to the severity of the clinical symptoms. Many thyroids removed from patients with high metabolic rates and severe, typical symptoms show much less marked hyperplasia than glands from cases with lower rates and much less pronounced clinical symptoms.

Iodine therapy greatly changes the appearance of the gland, so, since iodine is so generally used at the present time, the goiters which are now being removed by the surgeon show a much less typical picture of hyperplasia than those formerly examined. The administration of iodine tends to bring the hyperplastic thyroid back to the resting stage with many more acini lined with low cuboidal epithelium and filled with a colloid. The hyperplastic acini are much less numerous and tend to be arranged in small groups instead of diffusely arranged throughout the gland. The papillary projections are much less prominent, often being represented only by small projections on the walls of the acini. So different is the picture that in many cases that

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have been typical exophthalmic goiters before the iodine was given, a diagnosis of exophthalmic goiter can not be made from the morphology alone.

The toxic adenomata consist of circumscribed areas in the substance of the gland, rarely on the surface, surrounded by a capsule of dense fibrous tissue and containing a center of soft, pale, moist tissue. They may be either single or multiple, large or small, solid or cystic, discolored by extravasated blood or containing deposits of calcareous salts. Microscopic sections show them to consist of two types, the so-called "fetal adenomata" and the colloid adenomata. The former consist of very small acini which are often merely cords of cells with no visible lumina, packed closely together. The other shows small, round acini, filled with colloid and lined by low epithelium although occasionally the epithelium may be higher and resembles more closely the hyperplastic type. The acini are separated, more or less widely, by loose connective or myxomatous tissue. At times these two forms are mixed to form one adenoma and blocks taken from different sections of the growth show different pictures. Some of these adenomata cause clinical toxic symptoms while others do not. With the present facilities at our disposal we are not able to differentiate the toxic from the non-toxic adenoma by a pathologic examination and the differentiation must be made upon purely clinical findings. Those showing more pronounced hyperplasia do not prove to be more toxic than those of the fetal or simple colloid type. These adenomata cause a distortion of the gland and are often present in glands which are greatly enlarged. They are practically never found in goiters of the exophthalmic type.

URISEPTIN

An examination of uriseptin made in the A. M. A. Chemical Laboratory was published in 1908. The report brought out that while uriseptin was claimed to contain formaldehyde combined with lithium in the presence of a concentrated extract of corn silk and couch grass, the examination showed that uriseptin was marketed under a deliberately false claim, in that it did not contain the lithium formaldehyde compound, but instead contained hexamethylenamine (methanamine) as its chief constituent, and also lithium benzoate. (Jour. A. M. A. April 30, 1927, p. 1438.)

SURGERY IN GASTRIC ULCER*

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Ulceration of the stomach, or, better, gastric ulcer, has been treated clinically for several generations; yet it is within the past two decades that the vast majority of observations both medical and surgical have occurred. There are numerous reasons for the relatively recent attention directed to the diagnosis and treatment of all gastric diseases, the chief being the substantiation and correlation of history and clinical findings first by radiographic examination, and, second, by the verification of the presence of these lesions through surgery. To the radiologist particularly are we indebted for the increased recognition of disease involving the alimentary canal.

The term peptic ulcer should be replaced by the terms gastric or duodenal ulcer, which designate the anatomical location of the combination. Since they differ as to location, tissues involved, chemical environment and adjacent viscera, their symptoms and therapy are not identical.

This paper will consider gastric ulcer, admitting the difficulty in classifying some of the lesions at the pyloro-duodenal junction often termed pre-pyloric, pyloric, post-pyloric or juxtapyloric. Macroscopically, ulcer beds with their surrounding areas of inflammatory reaction cross this more or less mythical borderline so that unless judged by the preponderence of areas involved it is sometimes impossible to classify the ulcer as to location beyond the above named terms.

Certain descriptive terms are sometimes used, such as: perforating, acute or chronic, penetrating, callous, bleeding, saddle type, niche, punch ulcer, round ulcer, kissing, multiple, hidden ulcer, etc. These various terms in a limited degree describe a predominant characteristic and several are often applicable to a given ulcer. Of interest is the term "hidden ulcer," which is applied to those small ulcers which, because of their size and location, defy detection pre-operatively and often at the exploration, and yet may be productive of even the severest reactions despite their limited involvement.

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Neither a specific microörganism nor trauma unattended by sepsis can be considered of direct causation. Earlier classed as a clinical entity it is now generally conceded to be but a local manifestation of a more general pathologic process, usually infection and the resultant toxemia. To this may be added postural and anatomic variations of the tissues as pointed out by Waugh,[1] which, however, if this theory is accepted, can probably be but predisposing factor.

The studies of Rosenow[2] have to date pioneered the field in the bacteriological causation of gastric ulcer, even showing an apparent selective action of the organism. Duval and Roux[3] have shown that subsequent infections alter the progress of the disease and have suggested the advisability of protective vaccinations in selected cases. While the question of abnormal secretion as an etiological factor in gastric ulcer is still debatable, Loepez and March,[4] after a series of observations, found that hypertonia of the parasympathetic system is not, in all probability, the causal agent in gastric ulcer although subsequently this hypertonia affects gastric functioning causing hyperperistalsis and hyperchlorhydria with eventual lowering of the resistance of the gastric mucosa to bacterial invasion; also that upon severing the vagus in the presence of extensive gastric ulcer the inverse of the above occurred, namely: the lessening of hyperactivity with a resultant hypoperistalsis and hypochlorhydria as well as cessation of pain. Their deductions are that atropine is therefore the drug indicated from a physiologic standpoint because of its inhibition of nerve tonus, and their experiments showed that its maximum effect was gained by its oral administration.

In a very interesting article, Devine,[5] applying the results of the monumental investigations of Hunter,[6] discusses the rôle of posture in gastric muscles and its possible relation to gastric disease. He maintains that the abnormal stimulation of function by the sympathetic and parasympathetic systems is directly involved and possibly the principal factor in the development of gastric ulcer. The sympathetic, he states, is continuous in its action, maintaining a more or less uniform tonicity, while the parasympathetic acts intermittently and is probably the conveying force that empties the viscus. These closely allied neural systems are complementary but not necessarily balanced. His deductions are that the formation of ulcer lies in a disturbance of these myoneural mechanisms. He further illustrates the probable manner of development of ulcer in stomach or duodenum. His conclusions are that the resultant hyperacidity is in itself one of the main factors in the causation of ulcer and that any procedure directed towards its cure must have as its basis the control of this acidity. Surgically, this is to be accomplished by increased drainage, the application of that operative method favoring alkaline regurgitation and the correction of this myoneural dysfunction by removal of its cause or by its eradication through resection. To substantiate his reasonings he has case charts relative to these factors that seemingly bear out his contentions.

The alleged controversies as to the respective merits of medical and surgical management in the treatment of gastric ulcers are, we feel, uncalled for. Gastric ulcer happily is rare. Willson[7] several years ago analyzed 1,000 consecutive cases with gastro-intestinal complaints, reporting but twenty-one gastric as against 115 duodenal ulcers. The presence of gastric ulcer is always of sufficient gravity to demand the cooperative services of all fields of medicine, for beyond the immediate alleviation of distress lies the detection and eradication of the causative agents. The recognition and disposal of foci of infection is paramount. Many of these foci may long since have done their damage; yet their removal, if possible, can but result in ultimate improvement.

The pathologists inform us that scars in the gastric mucosa, single and occasionally multiple, are seen at autopsy, which means that specialized cells have been replaced by other tissue which, in this new environment, is being constantly subjected to irritation. They also report the not infrequent finding of ulcers whose margins are heavily infiltrated with connective tissues with acute and active beds suggesting not only chronicity but also the possibility of reactivation.

The symptoms of gastric ulcer are usually more severe than those associated with duodenal ulcer, often completely incapacitating the sufferer because of pain, indigestion, hemorrhage and the resultant asthenia. Because of this severity of symptoms these sufferers continue to

search for relief until a complete investigation reveals the diagnosis. Their distress in itself precludes the temporizing, and this over a long period of time, so often seen in duodenal ulcers. The average patient of today is aquainted with the incidence of carcinoma and this, plus the severity of his symptoms, causes him to seek relief. His case is made a matter of record and as a result the ratio of incidence of gastric ulcer compared with duodenal ulcer is higher than probably actually exists.

That cases of gastric ulcer should, with few exceptions, have the benefit of competent medical management, all will agree. This régime should be continued irrespective of the ultimate surgical disposition of the case. Deaver[8] asserts that there is a potential danger in gastric ulcer medically treated of from 10 to 20 per cent from perforation, hemorrhage and their sequelæ.

An analytical survey of a series of cases, classifying those eventually resorting to surgery, will evolve several groups according to signs and symptoms, namely:

1. Those of the perforating type.
2. Those of the chronic penetrating type, with involvement of adjacent tissues.
3. Those which by their location, size and nature produce gastric retention despite medical effort.
4. Those ulcers in which profuse, frequent or uncontrollable hemorrhage occurs.
5. Those ulcers in which the presence of malignancy cannot be disproved.
6. Those with associated or coexisting abdominal diseases which in themselves handicap or defeat dietary and medical management.

As Moynihan[9] has stated, the necessity for surgery in gastric ulcer means that medical management has failed. Surgery may be considered much as a court of last appeal, though at no time can its tangible assurance be shared by a dietary and medical régime because of: (1) the ever present question of malignancy; (2) the possibility of perforation and hemorrhage; (3) the possibility of further involvement of contiguous organs.

To class a given ulcer preoperatively as benign or malignant is fraught with danger despite the age of the patient, site, size and duration of the lesion. Even at the operating table the differentiation of ulcer from neoplastic change is occasionally perplexing if not impossible. As to the incidence of malignancy developing in ulcer beds, opinions vary; however, most authorities recognize an apparent association, their statistics ranging from 5 per cent to as high as 70 per cent. Granting that cancer is occasional or but coincidental, the fact remains that pre-operatively we are unable to definitely state as to the nature of any given gastric ulcer, which fact in itself is an undebatable argument for surgical treatment.

Ulcers within the stomach show a marked predilection for the pars pylorica and lesser curvature, in which areas 85 to 90 per cent of all gastric ulcers are located. In view of our present methods of dealing with gastric ulcers surgically this is fortunate, for one of the most serious problems in the field of medical endeavor is encountered in those ulcers located in the fundal area and especially those proximal to the cardio-esophageal region, since the tendency of such ulcers is towards penetration with sacculation and subsequent retention, thereby producing not only further distressing symptoms but mechanical and physiological problems of great moment.

In considering the various types of surgical procedure it is convenient to analyze the efficiency of a given method according to the location of the ulcer. Since the major portion of ulcers occur in and about the pylorus this type has received the greatest attention. Pyloric ulcers are most often attended with obstruction and subsequent retention. Hence any operative interference has as its basis increased drainage, and gastro-enterostomy, in addition to being the first operation of this nature developed, has also been most frequently practiced.

Gastro-enterostomy was first done for a case of pyloric carcinoma in 1881 by Wolfler[10] in Vienna and was antecolic and aniso-peristaltic in approximation. From the first the results have been, in the main, gratifying beyond anticipation, providing an essential is present, namely, obstruction. It was only natural to apply so great a remedy to all other gastric maladies and as a result it was soon found inadequate. Observations over this relatively brief period of years have shown that, physiologically, gastro-enterostomy has a definite though limited field of usefulness. In malignancy it is obviously but palliative and in those ulcers with hemorrhagic

tendencies relief may be but partial. It was early recognized that when the ulcer lay distal to a properly placed stoma the prospect for results was much more favorable and yet gastro-enterostomy unaided has alleviated the sufferings of many patients whose ulcers lay high in the stomach cavity. This is probably accounted for by the increased drainage with lessening of mucosal irritation, and self-alkalinization.

From the standpoint of unaltered anatomical relations and the maintenance of normal physiologic activities, simple excision, at first thought, should be the desirable procedure; unfortunately, this is not borne out by experience. The phenomenon of healing, and with it cicatricial contractions plus the break in the peristaltic current, tends to produce the undesirable features of obstruction and retention which cannot always be overcome by the numerous "plasties" advocated. Simple resection seems to lend itself to subsequent adhesions to adjacent organs, thereby fixing an otherwise mobile organ. Excision alone is best suited to those few ulcers situated anteriorly or posteriorly away from the so-called "gutter." In our experience, excision alone is contraindicated anywhere in the pars pylorica. We have on several occasions been forced to re-operate this type of case because of later gastric malfunction, in which at the initial operation the ulcer seemed ideal for so simple a procedure. At the time of exploration one is often struck by the surprisingly high location of the ulcer as compared to the preoperative radiographic localization and the much greater involvement than is portrayed by either fluoroscope or film. This latter point may be a serious hindrance to a satisfactory excision alone as too much area is often involved.

The method of excision of the ulcer by knife or by cautery as advocated by Balfour,[11] supplemented by gastro-enterostomy, has much to commend it; especially so where the ulcer is located in the lower third of the stomach. By this procedure the ulcer is destroyed as an infective focus, the possibilities of recurrent hemorrhage as well as perforation are removed, and in addition early neoplastic changes may be entirely eradicated. In ulcers in or about the pars pylorica, excision and gastro-enterostomy offer an added assurance of success when cicatrization and contraction due to the plastic resection further narrow and obstruct the pyloric outlet. This enhances the early and continued functioning of the short-circuiting stoma.

In 1881, Billroth[12] evolved the operation which to date bears his name and is known as the Billroth I. This procedure consists of a pylorectomy or partial gastric resection with anastomosis of the duodenal stump to the partially closed end of the stomach. This operation, while an advance in gastric surgery, has certain definite drawbacks. It is difficult of application in the presence of marked tumefaction in and about the pylorus or duodenum or in the presence of coexisting duodenal ulcer. Again, in extensive resections, undue tension at the line of anastomosis may occur through shortage of the duodenal stump. Leakage at suture lines in this operation has been commonly claimed as one of its greatest faults. To obviate this factor Kocher[13] brought forth his modification, which, however, has never been universally adopted in view of subsequently improved procedures.

Shortly after Billroth's first method of gastric resection was published,[14] he brought forth his classical piece of work, the so-called Billroth II. Of all technical methods of gastric surgery this was the greatest advance for it widened the field of gastric surgery, as more extensive gastric involvements could be dealt with and in addition the gland-bearing areas could be extirpated. Another added feature was that it could be used as a two-stage operation, impossible with previous methods. However, there were still difficulties encountered; it was transmesocolic in approach, requiring the application of a gastro-jejunal anastomosis. Again, it was unsuited for major gastrectomies as the jejunal attachment was insufficient in area to prevent marked angulation of the afferent or efferent loops. To eliminate this, Hadra[15] in 1891 suggested that the arms adjacent to the stoma be attached to the stomach to prevent this kinking with resultant spur formation and obstruction.

The next definite advancement in the evolution of gastric surgery came through Polya's development[16] of his technic of resection with gastro-jejunostomy, end to side. This procedure allows resection of greater portions of the stomach, including the gland-bearing areas, without prolonging the operating time. It is a one-stage operation, transmesocolic in application. Several

years later Balfour[17] recommended the antecolic anastomosis of jejunum and stomach side to end, which has simplified the original method and is usually known as the Polya-Balfour or Anterior Polya. This modification has many improvements over its original in that it has further lessened the operating time and obviated transmesocolic hernia and strangulation; in fact it is an improvement from every point of view. For a one-stage method of gastric resection applicable to all magnitudes of involvement, we feel, the original technic as outlined by Polya or the Balfour modification is best suited. Great stress was laid on the jejunal approximation having the proximal loop at the lesser curvature side of the amputated end of the stomach to insure better drainage. Moynihan[18] in the fourth edition of his book on abdominal surgery describes in detail a method long used at the Leeds Infirmary in which the jejunal anastomosis is anterior in type with the proximal arm at the greater curvature margin, simply reversing the peristaltic current. This method is known as the Moynihan II. We have on two occasions, because of anatomical variations, used this method and it has been satisfactory. He also describes another method of anastomosis in which the jejunum is divided about six inches below the flexure; the distal end is closed and its side approximated to the stomach end while the severed proximal stump is united into the distal loop below the gastro-jejunal union. Mechanically this should be an ideal method; however, it involves too much surgery and has been discarded. He further states he has had several recurrences of trouble with this method.

In all the methods of extensive or high gastrectomies, knuckling of the proximal or distal arm or both with resultant narrowing of the lumen and obstruction may obtain. This probably occurs more often in those of transmesocolic approach as the base of the triangle formed by the loop is upwards with the apex at the rent in the mesocolon. However, in extensive gastrectomies done by the antecolic method, gravitation of loops with resultant pulling at points of gastric fixation can produce the same results. This convergence of the loops in the posterior type may, under certain conditions, produce the above mentioned kinking and spur formation, in spite of the application of Hadra's technic.

In 1892 Braun,[19] to combat this undesirable feature in gastro-enterostomy, performed entero-anastomosis between the afferent and efferent loops, and this has been utilized as indicated in all subsequent methods. In several instances we have applied this relatively simple procedure to a previously operated case. In two cases it was used with subsequent relief where the original operation was of many years' standing. A point here is worthy of note. When angulation of a loop with obstruction occurs there is a marked dilatation of the arm which must be considered at the time of the entero-anastomosis, for with the release of the obstruction the bowel soon regains its normal tonicity, thereby reducing the calibre of the stoma accordingly. Some surgeons apply this loop-to-loop anastomosis routinely in gastrectomies of major proportions. It has been our good fortune, when operating on the biliary tract, to have seen two of these which had been done seventeen and twenty-three years previously, where the stomæ were functioning.

Annular resection, variously termed the sleeve, cuff or cylindrical method, has certain definite limitations, as the ulcer must be at or near the pars media; from the standpoint of restoration of tissues it is ideal, yet because of its limited field of usefulness and the ever-present post-operative complications of hourglassing and deformity due to adhesions, we feel it is better supplanted by some other method of gastrectomy, which in addition removes the ulcer-bearing area of the lower stomach.

Schoemaker[20] of the Hague, Holland, before the Clinical Congress of American Surgeons, in 1921, described a method which he has developed following essentially the principle of the Billroth I, but in addition to which he removes a longitudinal portion of the lesser curvature and with it the gland-bearing area. He recommends a special gastric clamp to carry out the plastic resection. We have had no experience with this method.

The disposition of the amputated duodenal end pertains in all types of gastrectomy with the exception of the Billroth I, Schoemaker and Annular methods. While the literature generally makes but little mention of it, its successful closure may, under certain conditions, be exceedingly difficult because of anatomic variations, inflammatory processes such as duodenitis, duode-

nal ulcer and adhesions. The ease of closure can be greatly augmented by the identification and preliminary ligation of adjacent vessels, particularly the postpyloric group. While the purse-string method is desirable, it cannot always be employed. Invagination of the margins with serosa-to-serosa approximation must always be done, following which further protection is secured by tacking over tags of fat omentum, or by burying the stump in contiguous tissues. In cases with a short stump where the ulcer lies sufficiently high, a portion of the pars pylorica may be left to facilitate greater ease of closure, adopting the principle worked out by Andrews[21] in disconnecting gastro-enterostomy stomata and later described by Devine[22]. We have done this on several occasions with satisfying results.

The various procedures above mentioned and but briefly described are essentially the outstanding technical advances in gastric surgery. That there is still need for further development, all will agree.

As previously inferred, the actual application of any given method is but a step in the individual's return to health and he should be under the co-operative guidance of medical supervision. At this time one should mention the advances that have been made in anesthesia, particularly the use of local anesthesia, especially in the aged, dehydrated individual, with associated pathologic processes, who, despite preoperative preparation, ofttimes remains a poor risk.

No particular mention has been made of the necessity for the proper disposition of associated intra-abdominal lesions occurring in conjunction with gastric ulcer. Any untreated pathologic process can but augur ill for the best of surgery aimed at the cure of gastric ulcer.

The success of gastric surgery, as in all procedures demanding judgment and manual dexterity, will be in keeping with the degree of technical skill developed. Team work is here a necessity if neatness and despatch are to be realized.

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DISCUSSION

DR. H. B. SWEETSER: Just before we came here Doctor Cabot asked me if I would open his discussion, and a discussion to be of value should be preceded by some thought. This paper shows a great deal of thought and research and is so much up-to-date that there are some things in it that I have not as yet become acquainted with.

First as regards diagnosis. We have made great advances in the differential diagnosis of gastric ulcer from duodenal ulcer by means of the *x*-ray. I used to think that hemorrhage from the stomach would pretty well indicate that our patient was suffering from an ulcer with active hemorrhage. That is not always true. I know of one case in which we had an enlarged spleen in which there was hemorrhage from the esophagus. You may have profuse hemorrhage due to varicosity of the esophageal vein.

There is a great difference of opinion as to the necessity of operating for gastric ulcer because of the likelihood of cancer. At Rochester they said that 5 per cent of the cases develop carcinoma. I personally agree. If I have a patient who comes to me at the cancer age with symptoms pointing back many, many years, I feel that that patient may have ulcer of the stomach without cancer. If I have a patient come to me at the same age, 40, 45 or 50, and he says he has never had any trouble with his stomach until the last month or two, this patient, I find, will probably have a carcinoma. I am regulated somewhat as regards diagnosis from this standpoint.

As regards methods of treatment. There has been a great deal said about excision of the ulcer-bearing area. Whether it is necessary to subject a patient to so serious an operation as excision of a large part of the stomach in the presence of ulcer which is, so far as we can see, not carcinoma, is debatable I think. If a person has a gastric ulcer and you feel pretty sure that it is not carcinoma, the good results of the less

dangerous operations recommend them. Gastro-enterostomy does not always succeed in curing your patients. It does relieve symptoms in a great many cases but not always. We have now a patient on whom I did a gastro-enterostomy twenty years ago for an ulcer of the stomach and for quite a while that patient was well. She again had vomiting of blood and now *x*-ray shows a penetrating ulcer high up on the lesser curvature near the esophagus. Her chest is so formed that the ulcer is probably two or three inches above the costal arch. With the test meal, that pocket will contain I should think about two or three grams. Every once in a while she will fill that. Something will obstruct the opening so that it fills and she is in pretty wretched shape. She will vomit a great deal. I would rather let her alone than attempt to do something we cannot get at. Any ulcer that is a saddle ulcer on the lesser curvature is a very difficult thing to take out and the higher it is toward the cardiac end the more difficult it is. We have had one in which we made a wedge and then did a gastro-enterostomy with good results. In ulcer near the pylorus the Horsley operation has been satisfactory in several cases.

In the presence of hemorrhage what are we to do? I think that less risk is run by waiting until the patient has recovered from the results of a severe hemorrhage than submitting him to a serious operation, which may be prolonged, in the presence of very marked anemia. Most of these patients do recover, and if one takes the opportune moment they can be operated on and relieved.

Dr. Ivar Sivertsen: I recently read an article relative to the value of gastro-enterostomy in a series of cases at Rochester, and in this article they claimed about 95 per cent perfect results after gastro-enterostomy. Dr. Cabot is to be complimented on this paper and I wish I had had an opportunity to digest it before discussion.

The question of a Billroth I operation was also discussed in the issue of the paper that was referred to above and a modified operation was described, known as a gastric duodenostomy. To me it looked to be a very satisfactory method from the standpoint of anàstomosis.

The question of hemorrhage is interesting. Some few years ago I had my own brother in the hospital with a hemorrhage from a gastric ulcer. Dr. H. B. Sweetser was called in consultation, and when the question of operation was spoken of, he advised waiting. His hemoglobin at this time was 60 per cent and normally was 85 per cent. When one has hemorrhage from an ulcer as close to home as was the above case one becomes very much concerned. Watchful waiting was practised in this case and he has had very little trouble since. I have never seen a case of carcinoma develop where a history of gastric ulcer hemorrhage some years before was elicited.

Dr. S. R. Maxeiner: I don't know whether the members have read Finster's work or not. It was rather interesting to see the radical operations which he advocated and which he performed under local anesthesia. He brings out very forcibly one thing which I have been following ever since I read his book with reference to the prevention of post-operative pneumonia. He makes every patient cough after the operation, believing that post-operative pneumonia results from the accumulation of secretions in the base of the lung because the patient has a sore abdominal wall and does not have a ready excursion of the chest and does not expectorate. He instructs his nurses to make the patient take deep breaths and cough, and he also instructs his ward surgeons to make the patient cough. If the patient does not cough and won't cough, then he uses forcible expression. The fact that he has performed 460 gastric resections without a death from pneumonia, makes one think there must be something to it.

Dr. W. D. White: I enjoyed this paper of Dr. Cabot's very much. In discussing the diagnosis he emphasized the use of the *x*-ray and rightfully so. However, I believe there is a tendency to neglect the clinical study and depend too much on the *x*-ray examination alone. When a patient gives a history suggestive of gastric ulcer I believe the best way is to give such a patient a careful clinical study before the patient is *x*-rayed. This should include gastric analysis, a clinical test as to the behavior of the distress, stool analysis for blood, etc. I know of a case recently where there was a definite history of ulcer obtained and a complete examination and study was made and the patient sent to *x*-ray and the report came back stating that there was no evidence of gastric pathology. On account of the definite history and findings the patient was *x*-rayed again and definite findings indicating a gastric ulcer were found.

Dr. Cabot has touched on the possibility of carcinoma arising at the site of an ulcer. Statistics vary greatly on this point with different observers. It is very likely that carcinoma does not arise as frequently at the site of an ulcer as has been stated by some. However, many times when papers are read on this subject it will be stated that carcinoma may arise from an ulcer and give this as one of the indications for operation. Then later in discussing this subject they will state that gastro-enterostomy gives a satisfactory method of treating stomach ulcer.

It would seem to me that if the tendency of a malignancy to arise at the site of an ulcer is one of the indications for operation, more than a gastro-enterostomy should be done; that is, a resection and a gastro-enterostomy would be a more logical method of treating a stomach ulcer where malignancy is to be considered. Simple resection of an ulcer itself is not always satisfactory because of cicatricial contraction that will occur and interfere with the emptying of the stomach.

I feel that Dr. Cabot has given a very sane, thorough and conservative discussion of this subject.

SOME PRESENT DAY PHASES OF THE MEDICAL TREATMENT OF DUODENAL ULCER*

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The fact that there is a natural tendency for duodenal ulcer to heal is no doubt one reason why so many different methods of treatment yield good results in the majority of cases.

Medical management should afford relief to our patients within twenty-four hours. If this does not occur our treatment is faulty or, as is more often the case, an incomplete or mistaken diagnosis has been made. As long as there exist various conceptions as to the etiologic factors in duodenal ulcer there will, no doubt, also exist variations in treatment.

It seems logical that the treatment should be made to fit the particular case in hand. It is essential to study the patient's constitutional make-up and to direct his mode of living.

Better hygiene, attention to dental infections, proper mastication, removal of diseased tonsils, more hours of rest are factors which help to eliminate many an ulcer.

The medical management of uncomplicated duodenal ulcer is very satisfactory if proper attention is given to dietary details. Too often the patient is given alkalies and told to eliminate meats or other foods from his diet with the result that nothing is accomplished. As a matter of fact the secret of all diets lies in the frequency and regularity of feedings. A great variety of diets have been recommended. All or most diets in common use are modifications of the Lenhartz diet. This is, no doubt, the reason why so many of them produce results. However, individualization is important. The diet should be arranged to fit the patient at hand. A routine diet for all patients is faulty. Some patients do well on milk diets, while others may have an aversion to milk and will do better on other soft foods. Foods should be simple, free from spices and of proper caloric value, vitamine and mineral content. After all, the basic reason for giving soft, bland foods in small quantities and at frequent intervals is that thus less motor activity is required and the stomach secures much-needed rest.

If the patient is actually ill, anemic, much under weight or has had a hemorrhage, a few weeks rest in bed is essential. We find it impossible to put the average ulcer patient in bed for any length of time. As a rule patients are allowed to continue their work but if they can spend at least the first week at home resting, better results can be expected.

Harris stresses the personal equation in dieting ulcer patients. He speaks of the necessity of providing proper vitamine content and also of considering the patient's age, weight and general condition. He prescribes a specific, balanced diet for each individual patient and emphasizes the necessity of applied personal hygiene.

Bastedo says that duodenal ulcer is not so serious a disease as gastric ulcer and the outcome of treatment medically or surgically is more often satisfactory. In his opinion medical treatment is successful in the majority of cases of duodenal ulcer. His treatment includes rest in bed for three or four weeks and a diet beginning with peptonized milk and the gradual addition of eggs, cream, toast, cereal, custard, farina, potato, milk and cereal puddings, vegetable purees and ice cream. The meals are small and frequent and not given ice cold. He uses alkalies in moderation and never uses lavage as a routine. Duodenal feeding, he considers an unnecessary trouble. The treatment is assumed to take a long time and the diet should be strictly regulated for at least a year. Those patients who do not become symptom-free within twenty-four to forty-eight hours and remain so are transferred to the surgeon.

Coleman has recently advocated a three to five day fasting for the stomach while he nourishes the patient with glucose per rectum and gives by mouth only egg-white and olive oil or cream. This diet is deficient in vitamines and minerals. Then, too, many patients cannot tolerate the prolonged administration of nutrient enemata.

Before instituting medical treatment one should be certain that the patient's condition is favorable for such procedure.

The effect of treatment also will depend upon the extent of the pathologic lesion. Slight erosions heal more readily than deep ulcers. Constitutional predisposition and associated or

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concomitant lesions will naturally affect the result of treatment or tend to cause recurrences.

The consideration of gastric ulcer in this paper has purposely been omitted because of the fact that, even when the crater is small, one cannot with certainty eliminate the possibility of cancer. It is naturally a much more dangerous disease and its treatment demands entirely different consideration. Certainly surgical measures are safest in all except the very early or recent gastric ulcers.

In the duodenum the possibility of malignancy is very remote. However, if there is marked obstruction, if there have been repeated or severe hemorrhages, if the patient has had repeated more or less unsuccessful medical managements, or if he is a laborer who cannot or lacks sufficient intelligence to carry out instructions, surgery should be recommended.

Alvarez believes that the medical treatment should be reserved for early cases and for those who have leisure and money to spend on what may turn out to be but temporary relief, and for those who on account of business or other reasons cannot afford the time for an operation.

He also endorses the ambulatory treatment for those who must remain at work. For these he advises three meals chosen from a smooth diet list together with between-meal feedings of milk, cream and eggs. If milk is not tolerated he substitutes thin cereal gruels. He finds that most patients get along comfortably on frequent feedings without the use of alkalies. In the last thirteen years he has prescribed alkalies only five or six times.

It has been pretty well established that the acid gastric juice is not the factor which prevents healing even though it may have played a part in causing the ulcer. We know that ulcers heal spontaneously even when gastric acidity is high and also that ulcers occur in stomachs which have little or no free hydrochloric acid.

Many patients get along very well when little or no alkalies are administered and we have seen them get along better without alkalies.

Frick says that if infection and functional hyperacidity are the factors which prevent healing, alkalies are definitely contraindicated and he favors sedative treatment.

He starts his patients with a fast, allowing only small amounts of water at frequent intervals until the patient has been free from pain for twenty-four hours. Water, he says, inhibits hunger contractions. Rectal feedings are not used except in cases of extreme debility or profuse hemorrhage. In his diet, he eliminates meat extracts, acids and alcohol entirely and reduces the salt intake to a minimum. He prescribes fats freely with proteins and carbohydrates, minerals and vitamines to balance the diet. He increases the diet very gradually and uses bismuth subnitrate alone or with opiates because it acts as an anodyne, an antiseptic and an antiphlogistic. From his experiece with 700 cases he finds that alkalies are unnecessary in the average case.

Some have pointed out actual danger in the prolonged administration of alkalies. Hardt and Rivers have carried out investigations in regard to intoxication resulting from alkaline therapy. Jordan recently studied the effects of alkalies as administered in the Sippy treatment of duodenal ulcer and found abundant evidence of alkalemia. She suggests that a minimum dosage of alkalies necessary for neutralization be established in each case.

I do not wish to imply that we have discontinued the use of alkalies nor have we seen cases of alkali poisoning. No doubt, however, many patients are given more than ample dosage or are continued too long on alkalies. We prefer to begin the treatment with minimum doses of alkali between feedings and gradually reduce the dosage. Here too, much difference is found in individual cases. As a rule all alkalies can be discontinued after the first six weeks of treatment.

Frick likewise advocates the ambulatory management of those cases which are not acute and of those which are not complicated by anemia or gastric dilatation.

Most patients get along nicely and eventually recover on ambulatory management but if the patient can rest at home for a week or so the treatment is greatly facilitated.

Prolonged treatment in bed is usually necessary only in acute cases with extreme tenderness, in cases with marked gastroptosis or if there has been bleeding.

General hygiene, regular habits, eradication of infectious foci and moderation in eating, drinking and smoking will do much to prevent a recurrence of duodenal ulcer.

We recently sent out questionnaires to 294 cases diagnosed as uncomplicated duodenal ulcer. All have been under observation more or less from two to five years. To date, replies have been received from 152. Of these almost 50 per cent state that they have been symptom-free; about 15 per cent report that they are much better but still have periods of discomfort; another 15 per cent report that they have been operated, presumably for ulcer; about 12 per cent declare that they are no better and the other 8 per cent report that they have been operated and found to have other trouble, usually gall-bladder disease. Of the latter 8 per cent two were reported as dead.

Among the 27 per cent who declare that they are no better or only improved, no doubt many could be found who have not remained under observation and have not carefully adhered to any dietary program. Some of them are surgical and others have associated diseases or conditions other than that diagnosed.

Naturally one wonders what has become of the large number from whom no reply has been received. It seems, however, that one could expect at least as favorable a percentage of recoveries from them. Reports are still coming in and usually the patients who are no better are the first to make the fact known. Many have moved and cannot be located.

CONCLUSIONS

Dietary management, with consideration of the constitutional requirements of the individual, produces good results in the majority of uncomplicated cases of duodenal ulcer.

Ambulatory management is not only an economic necessity, in the average patient, but produces good results when the diet is properly regulated and when the patient co-operates.

Rest in bed is imperative when the patient is acutely ill, anemic due to recent hemorrhage, undernourished or when there is marked ptosis.

The frequency and regularity of feedings are of much greater importance than the administration of alkalies. The amount of alkali given should be reduced to a minimum and many patients will do well on little or no alkali.

Proper attention should be given to personal hygiene, foci of infection should be eradicated and the patient's habits and mode of living should be regulated.

Observation and treatment should continue for at least one year. Some patients will have to remain on a restricted, yet sufficiently nourishing, diet indefinitely. Most of them soon learn that after all we should eat to live and as soon as they discover that their stomachs are not made of cast iron all is well.

If relief is not permanent in spite of dietary restrictions the patient either has associated or complicating trouble such as obstruction or gall-bladder disease, or for some other reason will not respond to dietary management and is surgical.

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THE ORGANISM OF RHEUMATIC FEVER

A report of the isolation of the specific organism causing rheumatic fever has been published, and also the results of trials with an antiserum. Streptococcus cardioarthritidis, the name given to the organism which was isolated from the blood culture of only two patients with rheumatic fever, differs in only one respect from the usual non-hemolytic streptococcus. The claim of the relation of the organism to rheumatic fever appears to rest chiefly on the results obtained from treating patients with an antiserum prepared by immunizing a horse with this streptococcus. The case reports are not convincing. Favorable reports with a serum prepared by immunizing horses with cultures of streptococci isolated from throats of rheumatic fever patients have been published previously; they were probably due to a non-specific reaction. Since then, curative effects have been reported from the use of various forms of non-specific protein preparations. (Jour. A. M. A., Feb. 5, 1927, p. 405.)

TREATMENT AND RESULTS IN FRACTURE OF SHAFT OF FEMUR*

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The following is a brief review of fifty cases of fracture of the shaft of the femur. Inasmuch as there is a marked diversity in methods of treatment, standard methods will be reviewed. Twenty cases were followed and results of treatment tabulated. A few case histories and case demonstrations will be given to demonstrate the need of adequate treatment; also to show end-results and some complications which often follow.

CHART I

Fifty Cases

Kind of Fracture	Simple	42	Simple Commin.	4	Compound	4
Type of Fracture	Oblique	13	Transverse	23	Spiral Oblique	14
Site of Fracture	Upper Third	17	Middle Third	23	Lower Third	10
Type—according to site	Upper Third Ob. 94%		Middle Third Tr. 65%		Lower Third Equal No. 0 and T	
Site of Compound and Comminuted	Upper Third Comp. 0 Commin. 0		Middle Third Comp. 3 Commin. 3		Lower Third Commin. 1 Comp. 1	
Age Percentage	Under 15 years 65%		Under 25 years 84%		Over 55 years 4%	

The treatment of all fractures and therefore of the shaft of the femur is directed toward: (1) reduction of the fracture, followed by (2) immobilization or fixation of the bones in the corrected position.

The particular type of treatment to be used depends: (1) upon the type of fracture (*i.e.*, whether simple, compound, comminuted, transverse oblique or spiral oblique); (2) upon its location; (3) upon the age and general condition of the patient; (4) upon the ability of the attending surgeon to utilize available methods.

In this series, treatment was in most cases instituted early. Only four cases were untreated for more than twenty-four hours after entrance. Ether was used in 66 per cent of cases in attempting reduction. There were thirteen operative cases, confined mainly to the lower (24 per cent) and middle third (76 per cent) fractures.

For brevity, the types of fracture and age percentages will be charted.

The accompanying table reveals the relative infrequency of compound (8 per cent) and comminuted (8 per cent) fractures and further that they were located in the middle and lower thirds.

There is a relative high percentage of fractures in the middle and upper thirds. Oblique and spiral oblique fractures predominate in the upper and transverse in the middle third. The type of fracture (whether oblique or transverse) depends to a great extent upon whether the cause is direct or indirect violence. In the former, transverse fractures usually result, and in the latter oblique or spiral fractures follow. Most fractures of the shaft of the femur occur in youthful individuals.

This probably explains the variety of treatments given, nature aiding in the end-results. Fear of complications due to debility as in fractures of the neck of the femur is almost out of the question here. Union should be more rapid. There should be fewer local complications and a better prognosis in those cases demanding operative interference.

Having observed the age limits and types of fracture, it is interesting to note that sixteen varieties of treatment were used in the fifty cases. This does not include the six methods used in treating the thirteen operative cases. Briefly operative methods consisted of simple jamming of bones together in proper apposition; beef bone plate; Lane plate; Parham band; autogenous

*Membership thesis prepared from study of St. Mary's hospital (Duluth) records, covering cases from 1918 to 1924 inclusive, and read before the staff at its regular meeting April 7, 1927.

graft. In one case, removal of sequestrum was necessary in a compound infected fracture. The next chart illustrates the types of reduction used here.

It will be noted that there are two forms of skeletal traction which have not been used in this series—ice tongs or Besley tongs and Steinman nail. Further, that the forms of treatment predominating here are the simplest, namely, overhead right-angle suspension, Buck's extension, Thomas splint, and cast only. Elastic traction is the method of choice in this group.

I shall briefly review some of the common methods of treatment, keeping in mind the cardinal principles of treatment in shaft fractures as follows:

1. The lower mobile fragment must be apposed to the more fixed and usually rotated upper fragment.

2. Traction must be directed in the line of the long axis of bone, and therefore usually in the line of the upper fragment.

3. X-ray follow-up plates must be taken to demonstrate the correctness of the treatment.

I shall discuss treatment under three heads—upper, middle and lower thirds. In many instances one method is suitable for fractures in the adjoining third of the shaft, but rarely in all three locations between the trochanters and condyles.

In order to know the reason for a given form of treatment, a short anatomical review of fracture in the upper third will be given with the aid of a diagram. This will explain muscle pull in the middle third as well.

Upper third (subtrochanteric) fractures are usually oblique, and therefore there is almost always displacement of fragments (Fig. 1). The

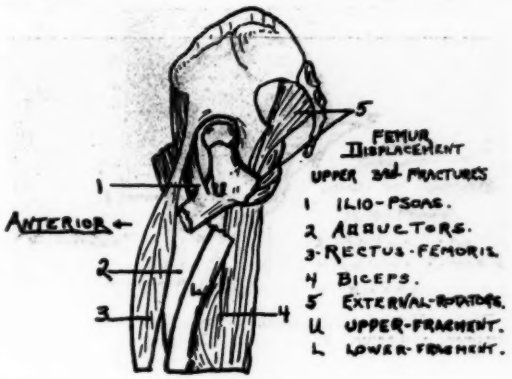

Fig. 1.

small upper fragment (U) is usually tilted forward by the iliopsoas muscle, and abducted and everted by the gluteus minimus and external rotators. The lower fragment (L) is pulled upwards and inwards by the hamstrings and abductors and there is usually eversion due to weight of foot and abductors. It is evident from the above that the usual methods of long splints and extension will almost always give union with angulation and faulty rotation.

Davison's method can be used in older children and in adults. As illustrated in Figure 2, it consists of a Buck's extension on the leg.

CHART II

Type of Treatment	No. Cases	Type of Treatment	No. Cases
Overhead Extension Alone	2	Buck's Extension + Double Inc. Pl. + Cast	1
Overhead Extension + Cast	9	Buck's Extension + O.R. + Cast	5
Overhead Extension + Lateral Splints + Cast	2	Thomas Splint Only	5
Overhead Extension + O.R. + Cast	3	Thomas Splint + O.R. + Cast	1
Overhead Extension + Thomas Splint + O.R. + Cast	1	Thomas Splint + Cast	3
Buck's Extension Only	1	Immediate O.R. + Cast	4
Buck's Extension + Cast	5	Double Incline Plane + Cast	1
Buck's Extension + Thomas Splint	1	Cast to Mid. Femur + Buck's Cast	1
		Hip Spica Abduction Only	5

The knee is slightly flexed. An anterior molded splint (plaster) is applied over the leg and thigh which is secured by a gauze bandage. A series of rings can be incorporated in the plaster in such positions that external rotation will follow.

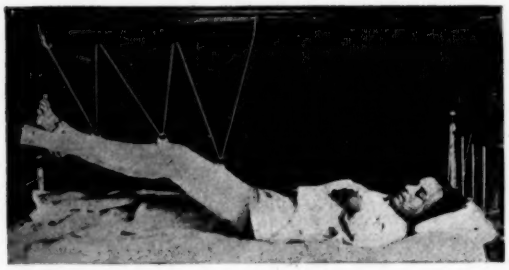

Fig. 2. Method of suspension by anterior molded splint in treatment of fractures of the femur (Davison).

The leg is abducted and suspended high enough to allow the lower to fall in line with the anterior pointing upper fragment. Shortening is overcome by weights on the Buck's extension.

A common method shown in Figure 3 is the right angle overhead elastic traction of Schede. It is used often because it is simple and does not attempt anatomical reposition of fragments. In spite of its simplicity and poor anatomical results, it succeeds. This is due to the fact that in children under fifteen years of age a good functional result depends less upon good anatomical results than in older individuals. Bad functional results are almost negligible (3 per cent).[1]

In our series there were thirteen cases treated by this method. They were all under eleven years of age. Extension was removed on an average of thirty-four days. In eleven cases plaster spica was applied. Two infants required only suspension. Two cases required operative interference, but these were in fractures of the middle third where this type of treatment is also used.

In *middle third fractures* there is no uniformity in the position which the fragments assume. Displacement almost always occurs. Overriding may be marked. The normal anterior bow of the femur may be easily distorted by malunion. The upper fragment is usually tilted forwards. The lower fragment is pulled upward and inward, the displacement being in much the same direction as in the upper third, with usually more overlapping.

Most of the fractures of the middle third were transverse. An attempt should be made to reduce all transverse fractures immediately. Failing this, traction should be tried. About two weeks of this is enough to determine its success. If correction cannot be made, operative interference is indicated.

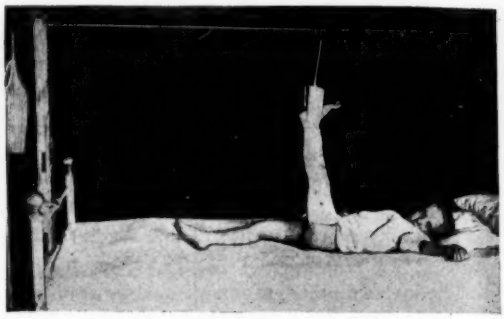

Fig. 3. Suspension method of treatment of fractures of thigh in children (Davison).

A closed method here illustrated (Fig. 4) is simple and effective in middle third fractures. It

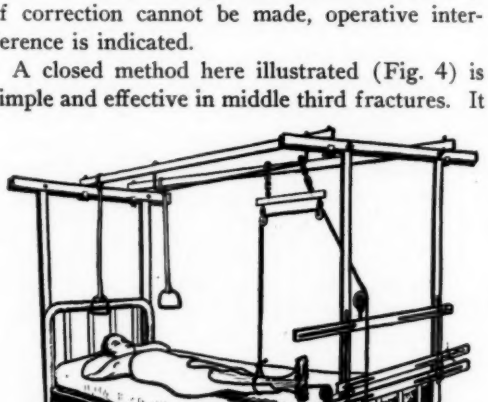

Fig. 4. Type of mechanical apparatus used in this type of traction. The weight of vertical traction is enough to lift the leg from the bed about 6 or 8 inches (average 16 pounds probably). The foot of the bed is elevated 8 inches. The position of the leg is from 15 to 25 degrees abduction, the knee is slightly flexed, and the foot is balanced at right angles to the leg. The Sinclair skate is used as a block at the foot. The handholds allow the patient to move about in bed.

may be used in upper third fractures also. It is the method of West[2] consisting of Buck's extension and a body cast. The latter may include one or both thighs. In the injured limb it

should surround the thigh down to its lower third and extend from there as a posterior splint to the middle of the leg. Combined with Buck's extension applied prior to application of cast, and with elevation of the foot of bed and appli-

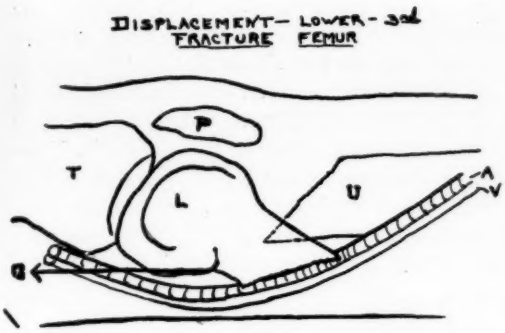

Fig. 5.

cation of frame to bed, it allows abduction and a degree of comfort to the patient.

In the *lower third* one sees an occasional impaction with the fragments in good alignment. These cases are easily handled but are not frequent. The usual form of displacement is shown here (Fig. 5). Lower third fractures included here do not include the joint but are supracondyloid. As seen in this fracture, the lower fragment in direct violence is usually tilted backwards and may compress or rupture the popliteal vessels or injure the nerve. This often results in gangrene. The upper fragment lies forward and if oblique may penetrate and become fixed in the quadriceps muscle group.

If the upper fragment is not fixed in the muscle tissue, the double incline plane or Besley tong may be used. To reduce the fracture, the leg must be flexed upon the thigh until the lower fragment takes the same axis as the upper. In the double incline plane, the angle is adjusted so that the weight of the body pulling against the fixed flexed knee produces extension sufficient to appose the fragments.

Another method is the ice tong or Besley Caliper. Eliason[3] believes this to be the best method of treatment in adults for lower third fractures. It is shown here (Fig. 6). It may be used in middle third fractures as well. Orr[4] is opposed to elastic traction and prefers ice tongs or fixed traction alone or in combination with cast treatment. The technic is not difficult and can be carried out aseptically. If the points are driven into the bone far enough so that a weight will be borne, traction can be made in a direction which with flexion of knee will overcome the flexed lower fragment. If a cast is used, Orr believes a double spica is preferable to the single.

Operative technic will not be discussed. In view of the relatively high percentage of operative cases (26 per cent), a few remarks in regard to indications are in order. The marked diversity of opinion on this subject is probably due to the fact that (1) few men are capable of applying the exacting technic correctly, and (2) operative methods are used when closed reduction has failed. It is evident that without the proper skill and given only the hardest cases to treat, an accurate comparison of results of open and closed reduction is not possible.

It has been shown by the report of the American Surgical Association, 1915, that "early operation is preferred if and when operative

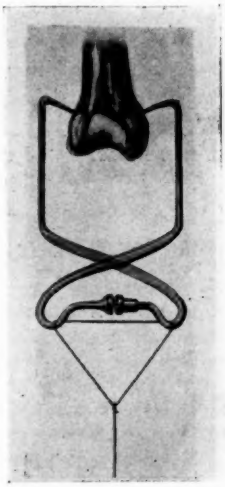

Fig. 6. Pearson's extension callipers.

methods are decided upon." This committee further believes that in a given case of poor reduction by closed methods, it is not advisable to operate "unless reasonably certain that an accurate anatomical result can be secured." Except in younger individuals, it has been found that if a good functional result is to follow, a good anatomical position must be attained. If good reposition is not brought about by opera-

tion, the additional injury to the soft parts is detrimental.

It is the opinion of Sherman[5] that in simple fractures the operation should be done within ten or twelve days following injury. Further, granting the necessary skill and equipment in all shaft fractures in which there is overlapping or in which there is less than 25 per cent end-to-end approximation of the fractured surfaces, operative treatment is indicated. At the other extreme, we find the following statement by Hill: "Open reduction is the treatment of last resort and should be undertaken only by a surgeon familiar with the hazards of bone surgery." Anyone who has cared for an infected case will agree with this statement. The poor lymphatic supply in the region of a fracture will not allow for the same technical error as the peritoneum.

Aside from non-union and malunion "persistence of deformity of such a kind and degree as to cause serious loss of function, and which cannot be corrected by closed methods," seems to be the indication generally held today for operative interference. The degree of deformity considered sufficient to warrant open reduction varies from 25 per cent apposition to overlapping, depending upon individual judgment.

The *results* of *fracture* of the *shaft* of the *femur* are listed in a follow-up of twenty cases, 65 per cent being under fifteen years of age and 35 per cent over. Fourteen different methods were used in treating the twenty cases. There were four operative cases. No attempt will be made to compare operative and non-operative results because of the small number of operative cases. The following chart will illustrate the findings.

It will be seen that simple non-complicated operative cases treated after closed methods failed left the hospital 8.4 days sooner than those cases treated by closed methods alone, that is, if we begin counting from the day of operation. Operative cases were bedridden 4.9 weeks less than those treated non-operatively. Crutches were discarded 5.3 weeks sooner in simple operative reduction cases. Total disability was slightly less in operative cases, but, as I said before, the number of cases was too small for accurate comparison. Permanent disability was present in 20 per cent of cases heard from and in all consisted of a limp, with pain in leg in one case and stiffness in another. Total disability in all cases of fracture of the shaft of the femur was 7.1 months as compared with 6.1 months.[1] Evidently a good functional result was obtained in 80 per cent of all cases and disability extended from two months in infants to eighteen months or permanent limp in adults. Inasmuch as there is

CHART III

Comparative Results Operative Reduction and Non-operative Reduction. Twenty Cases.

No. of cases	Type of fracture	Number of days in hospital	Disability in bed, chair and wheel chair No. of weeks	How long were crutches used? No. of weeks	After crutches were (*a*) pain in limb, (*b*) stiffness in knee, (*c*) limp noted	Further treatment has been necessary No. of cases	Total disability from work or usual duties No. of months	Permanent disability
12	Closed ℞ Simple	37	15	12.8	25%	2	6.9	Limp 2
2	Closed ℞ S. Comminuted	86.6	14.5	25	100%	0	9.7	0
4	Open ℞ Simple	28.6	10.1	7.5	75%	0	6.2	Limp 1
2	Open ℞ Compound	163.5	15	19	100%	1	8	Limp 1
20	All	57.1	13.6	12.3	(*a*) 33% (*b*) 50% (*c*) 29%	3	7.1	4

a high percentage of patients complaining of stiffness in the knee, limp and pain, more care should be exercised in attempting forceful reduction. Also, after-treatment with massage and proper movements should be given.

and give in most cases merely the appearance of well maintained reduction. Further, after their application, the patient is usually sent home so that *x*-ray follow up is usually nil except when too late.

Fig. 7. Case 1. (a) First plate. (b) Three weeks later. (c) Three months later.

Our results are the same as Scudder's report of simple uncomplicated fractures in patients under fifteen years of age showing one hundred per cent good functional results in this class of cases. Over fifteen years of age his report was 24 per cent good functional result, our was 66 per cent (his series includes sixteen and five cases respectively).

In infants fracture of the femur shaft does not seem serious, as two cases showed no delay in learning to walk.

No mortality was noted in this series of fifty cases. In fifteen hospitals and over 11,946 cases treated non-operatively, the death rate has been reported 1 per cent.[1] In the operative cases (1,040) the death rate was 0.77 per cent.

In those cases treated by cast *alone* only one showed a good anatomical result. The rest were poor. Cast alone without traction, except in cases of impaction or immediate reduction, should not be used. The closed methods may be safe and serviceable but large casts are deceptive

Case 1.—(Upper third. Figure 7, a, b and c.) Female, aged 6, injured in auto accident. General examination negative except sugar in urine in two tests. Fracture of upper third spiral oblique. Treatment consisted in vertical (right angle) extension twenty-three days; hip-spica cast twenty-two days; crutches two weeks. There is very little demonstrable shortening. A good functional result.

This case illustrates what nature will accomplish in individuals under fifteen years of age. It is the cause of the statement that non-operative measures are especially effectual in this age group, due to the growth of tissue.

Case 2.—(Middle third. Figure 8, a, b and c.) Male, aged 6. Auto injury. General examination is negative except for general bruising over body. *X*-ray shows a transverse fracture with ragged edges and overriding of fragments. Treatment consisted in Thomas splint with abduction after unsuccessful attempt at reduction under ether. Overhead traction was then used. After two weeks of closed reduction attempts, operation performed. Intervening muscle tissue, rotation of upper fragment noted. Ends of bone cleaned and fragments apposed corrected and jammed in this position. There was no internal fixation. A plaster spica was applied and patient was sent

home. As you will see, he has a good functional result without shortening. Compared with previous case, this one illustrates the "cabinet fit possible in open reduction."

CASE 3.—(Lower third. Figure 9, a and b.) Male, aged 10. Auto injury. General examination showed patient in poor condition and not fit for operation. Treatment consisted in overhead extension one week; Thomas splint two weeks. Patient developed slough of toes necessitating amputation. In hospital two months, used crutches one week. Now limps and has pain in foot and behind knee. Examination shows a rather frail child. In the right leg there is marked atrophy of muscles. The foot is cold and blue. Flexion is complete. Extension painful (popliteal space) when forced to 180. There is about one inch shortening. The deformity shown on *x*-ray plate can be palpated.

This case illustrates the danger of backward dislocation of the lower fragment due to the pull of the gastrocnemius muscle, and the need of treatment with flexion of the knee.

CASE 4.—(Middle third. Figure 10.) Patient is forty-one years old. This fracture occurred seventeen years ago. This was a splintered fracture. It was treated immediately by setting the bone and applying a hip-spica cast. This was removed six weeks later and non-union was noted. Open reduction was performed with fixation by silver wire. *X*-ray plate shows outward bowing, large callus and two silver wires in place. He has 1.5 inches shortening. He uses cane rather than elevation of heel. Complains of pain when weather changes and tires in the leg and has backache. There is marked compensatory tilting of pelvis. This case illustrates the deceptive nature of cast treatment. It also shows that open reduction is not always the method of choice even in late cases.

CASE 5.—(Middle third. Figure 11.) A case of malunion of thirty-seven years duration with compensatory tilting of pelvis. Patient was treated with Thomas splint only. Pelvis is tilted. Patient comes to me complaining of backache of many years duration. *X*-ray

Fig. 8. Case 2. (a) After one week—Thomas splint. (b) After second week—overhead extension. (c) One month after open reduction.

Fig. 9. Case 3. (a) A-P plate. (b) Lateral view.

(A-P plate) shows vicious union of overlapped ends. This case demonstrates what has often been our experience with indirect skeletal traction. Thomas splint is not always the best method. It is painful, does not allow for free manipulation of the lower fragment and distorts the normal anterior bow of the femur.

Fig. 10. Case 4. Seventeen years after open reduction.

Fig. 11. Case 5. Malunion after thirty-seven years.

SUMMARY

With increasing use of the *x*-ray in fracture work, both the profession and laity demand at least a fair anatomical result. A review of these cases shows that our treatment can be improved. It is known that a better functional result with decreased period of convalescence follows, if a good anatomical reposition is attained,—especially over the age of fifteen. It is not always possible to prevent unsatisfactory results by using any given treatment. However, it is well to know beforehand when to expect them and to recognize early the conditions which justify their prediction.

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LIGHT AND HEALTH*

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We know that plants need light as a source of energy in order to build up organic compounds. On the other hand, we know that certain kinds of bacteria are killed by light. Higher animals are able to live both with and without light but it is evident that light has a certain influence upon the function of the organs and upon the health of the animal. These statements also refer to human beings.

It has long been known that sunlight, as a rule, has a beneficial influence on the system and it seemed that it could be used to cure certain diseases. It was, however, not until fairly recently (at the end of the nineteenth century) that attempts were made to determine how light acts; and as yet we do not know very much about this action.

It seems evident that different kinds of light should have different influences and it is unfortunate that a thorough study of the effect from light of different wave lengths has not yet been made. We can illustrate the situation in the following way. Suppose we had found a deposit of a great number of inorganic salts well mixed together, salts containing Na, K, Ca, Fe, Al, Mg, Pb, Cl, I, Br, P, S, etc. We used this mixture and found it beneficial for certain individuals and that it sometimes had a curative action on certain diseases. We would, however, not find a quantitative relation (the salts not being uniformly mixed). Naturally we would get different opinions about the action of this mixture. Some doctors would find a greatly beneficial effect in a small group of cases; others would find no effect at all, and still others might find that the mixture produced untoward effects and was dangerous. To a certain extent we have this condition prevailing at mineral springs. Each spring has, however, a fairly constant concentration of salts.

It was not difficult for the doctors to learn that each substance had to be considered separately and it has been fairly well established what effects on the human system the different elements

*From the Cancer Institute and the Department of Physiology, University of Minnesota. Read by invitation before the Medical Staff of the Lymanhurst School, Dec. 16, 1926.

have and how much of a dose is required in a certain case. Why should not a similar consideration be given to light? It is true that the physician of today is better educated in chemistry than in physics and that he therefore understands and appreciates the underlying chemical principles better than the physical principles. If, however, he wants to use physical agencies such as light, does it not seem a necessary requirement that he should study the fundamental principles at first?

We consider light to be electromagnetic waves. That sounds perhaps discouraging and it may be easier to think of it as waves in a substance which is evenly distributed throughout the universe, the ether. We can compare these waves with waves produced on a water surface when a stone is dropped in quiet water. Troughs and ridges, or, in other words, waves, then spread out over the surface transversal to the direction in which the stone moved. The light waves are much shorter and move with much greater velocity than the water waves. They can vibrate in all directions which are at right angles to the direction of progression. If they do not vibrate in all these directions we call them polarized and thus we have to distinguish between unpolarized and polarized light. Some experiments thus far carried out seem to indicate that polarized light has more effect on living cells than unpolarized light but more experiments are required to settle this question. I might mention that the light coming from the moon is polarized. We use polarized light to determine certain properties of organic materials, *e.g.*, the rotation of sugars. In the following we will not consider polarization.

If waves are sent out from a vibrator, one wave is produced during one complete vibration. The number of vibrations during one second times the wave length therefore gives the distance the wave has proceeded during one second. The number of vibrations per second we call the frequency. Therefore we find that the velocity of the wave is equal to the frequency times the wave length ($c = \lambda\nu$ where c is the velocity of the light, λ the wave length and ν the frequency). All electromagnetic waves have a velocity of approximately 300,000 km. per second (186,000 miles) in vacuum. If we know the frequency we can easily calculate the wave length and vice versa. The wave length or the frequency is the most important characteristic of the wave. In Fig. I you will find the different kinds of electromagnetic waves which have been studied. The visible rays stretch approximately from 4000 to 8000 Å (1 mm. = 1000μ = 1,000,000 mμ = 10,000,000 Å). Violet has the shortest wave length. With increasing wave length the color changes to indigo, blue, green, yellow, orange and red. Beyond red we have the invisible infra-red, and still further out, the Hertzian waves which continue into the wireless waves. On the other side of the visible region we have the ultra-violet and still further out, the x-rays and the γ-rays from the radioactive elements. As a continuation of these we have the cosmic rays which now are being investigated by Kohlhoerster, A. Millikan and others. There is now practically no gap in the chain: almost every wave length has been registered by means of spectroscopes of different constructions except for the cosmic rays and the wireless rays, which have been studied by other means. You will notice how different the effects are from waves belonging to the different spectral regions.

We are here mainly interested in the visible, the infra-red and the ultra-violet radiations. It seems evident that in order to produce any effect the rays have to be absorbed, or, in other words, the incoming radiation energy must be changed into other forms of energy. The primary effect is produced where the absorption takes place. I will therefore refer to some absorption measurements which indicate how deeply the rays pentrate into the body. The few quantitative measurements which I have been able to find in the literature as well as some experiments carried out by M. Reinhard and myself, agree in that respect that the red rays show greatest penetration. However, only about twenty per cent of the red rays striking the skin perpendicularly, penetrate it (2.5 mm. thick, slightly pigmented skin). Some few millimeters under the skin the intensity drops down to one per cent, and one centimeter under the surface of the skin the intensity should not be over 0.2 per cent. This refers to the most penetrating of the light rays. Ultra-violet rays of the wave lengths 3660 Å are absorbed to such an extent that only about 0.000003 per cent penetrates the skin (2.5 mm. thick). The amount of light radiation absorbed by deep-seated tissue and by internal organs is

thousands or even millions times smaller than the amount absorbed by the dermal layer. It seems therefore probable that the primary effect of light radiation (whatever the wave length may be) is produced in the dermal layer and immediately adjacent tissues. Chemical products may then be picked up there and carried round with the blood. Bovie states that protozoa are very sensitive to ultra-violet radiation and are killed by a short exposure. If, however, very short ultra-violet rays are used, the effect is not so marked, evidently because practically all the radiation is absorbed by the protoplasm of the individual protozoan so that it does not reach the nucleus. This kind of radiation has probably no effect on us as it ought to be completely absorbed by the epidermis.

The skin is quite inhomogeneous and it is therefore difficult to determine quantitatively how much it absorbs. It is much easier to determine the absorption by blood, which shows several absorption bands. By an absorption band is meant that more is absorbed in a certain region of the spectrum than on either side of this region. The hemoglobin is responsible for the absorption bands in the visible part of the spectrum while the proteins (albumin and globulin) are responsible for a strong absorption band in the ultra-violet. We have been able to prove that this absorption takes place in certain parts of the protein molecule, viz., in the amino acids containing a benzine ring (mainly tyrosine and tryptophane). We might expect that light which is absorbed specifically by certain molecules has a selective action. This has not been proven as yet, but we have an indication in the tanning of the skin. Hausser and Vahle exposed skin to light which had been spread out to a spectrum and found that tanning was produced only on the part of the skin which had received light of wave lengths round 3000 Å with maximum effect between 2980 and 3010 Å. We might therefore assume that the pigment layer has an absorption band in this region but that has not been proven yet.

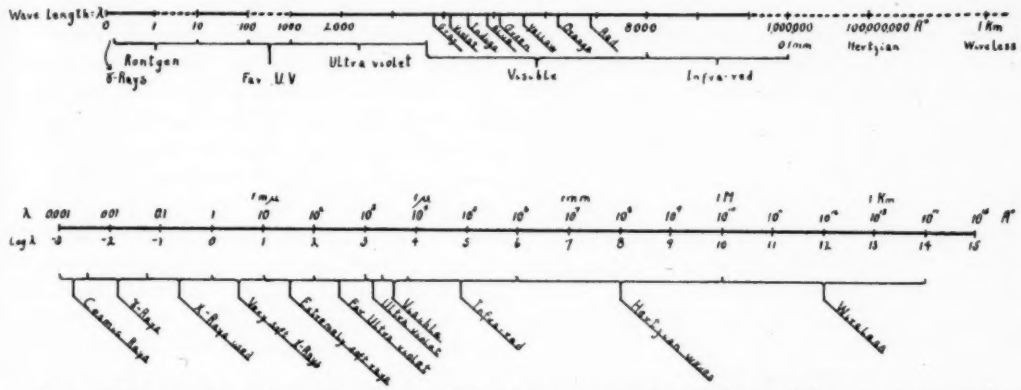

Fig 1. The upper chart shows the different kinds of electromagnetic radiations and the wave length regions covered by them. The lower chart shows the same relation in a logarithmic scale which gives a better comparison between the relative extent of the different regions.

1 km = 1000 m. = 1,000,000 mm. = 10^6 mm.
1 mm. = 1000 μ = 1,000,000 mμ = 10,000,000 Å
1 km = 10^{13} Å . 1 mm. = 10^7 Å

Not much has been established concerning the effects the different regions of the light spectrum produce in the body. That some chemical changes are produced by means of ultra-violet radiation is evident. In rachitic animals and children the free phosphorus content of the blood is increased, and some authors maintain that the calcium content also is increased.

An investigation by Carl Sonne at the Finsen Institute in Copenhagen, which I consider important, refers to heat effect of the radiation. He measured the temperature at the skin surface and at a certain depth (about 3 mm. under the skin) with thermo-couples and found that when he radiated this part of the body with visible rays, the temperature was higher some millimeters under the skin than at its surface. When he used infra-red rays, the temperature was highest on the surface of the skin. It is evident that

ultra-violet radiation will produce the highest temperature in the upper layer of the skin where most of it is absorbed. He further found that with visible radiation twice as much energy could be given as with infra-red radiation, and that the temperature thus could be raised to about 43° C. 3 mm. under the skin. Forty-three degrees centigrade is the average value he obtained in seven experiments with laboratory workers. Sonne assumes that the temperature of the blood in the skin capillaries is raised to this temperature, whereas the temperature of the tissues below is normal. He therefore considers that the visible radiation produces the "good" effects of fever without producing the harmful effects. As good effects, are counted the inciting effects upon the oxidation and the formation of antibodies and increased destruction of toxins. He refers to experiments which show that tetanolysin is debilitated seventy-eight times faster at 42° C. than at 37° C. Similar relations seem to hold for the destruction of other toxins. Sonne also made the following experiments. He injected thirty-eight mice subcutaneously with a minimum lethal dose of diphtheria toxin and gave half of them a light bath lasting two hours immediately after the injection. The unradiated animals had an average life-time of three and one-half days and every one died within five and one-half days. Five of the radiated animals lived thirty days or more and the others had an average life-time of 5.3 days. It seems reasonable to assume that part of the toxin was destroyed due to the raised temperature of the blood while it circulated through the skin capillaries. The importance of the temperature rise some millimeters under the skin may be considable, but naturally it is difficult to prove definitely that it is the main factor.

The bactericidal action of radiation is well known. It is mainly the ultra-violet rays which are effective and the action is, of course, very superficial. An ulcer can usually be sterilized only on the surface, and bacteria hidden by dead cells or protruding tissue may be saved from destruction. Intense radiation will also have destructive action on tissue cells. A superficial layer of tissue is, for instance, killed with the Finsen treatment of lupus.

The influence of light on hemoglobin is evidently of importance in metabolism. Light and especially ultra-violet light, increases the speed of reaction, both the oxidation in the presence of oxygen and the reduction in its absence (Hasselbalch).

We have so far considered mainly the direct action of the radiation. It seems to me that it is very important in this stage of light therapy that we learn more about the primary action and that we determine which particular wave lengths are responsible for the action. We also must keep in mind that it is quite possible that one wave length may have just the opposite effect of another wave length. If both are present at the same time, no effect will be produced.

Many indirect effects are produced by light radiation. For instance, respiration is influenced; breathing becomes slower and deeper. The minute volume of the right side of the heart is increased (Hasselbalch). The production of erythrocytes, blood platelets and leukocytes is influenced.

The curative action of light in rachitic children and animals and the prevention of rachitis in animals fed on vitamin-deficient food are quite well established. It seems to be proven that it is ultra-violet light of wave lengths between 2800 and 4000 Å which is effective in this respect. Of interest is also that similar protection against rickets can be obtained by radiating the food (cholesterol) instead of the animals, as experiments of Steenbock, Hess and others, seem to establish.

When we consider the effects of radiation mentioned it is evident that the influence of light upon the human body is very important. We must consider also that a great amount of exposure to the sun's radiation has been the normal condition for human beings for thousands of years and therefore we must expect that the body requires radiation in order to function with maximum efficiency.

It seems probable that the sun is the best light source for a healthy person who wants to keep well, but it may be that better light sources can be found for treatment of certain diseases. If we determine the wave lengths which have a beneficial action in a certain disease, then it should be fairly easy to find a light source which gives a proper amount of these particular rays.

The sunlight contains all kinds of rays from far out in the infra-red down to about 2900 Å

in the ultra-violet with a maximum intensity at about 5000 Å. This radiation is difficult to duplicate. The carbon arc comes closer to an imitation of the sunlight than any other artificial source. It can indeed be constructed so that its radiation approximates sunlight quite closely. For this purpose a very intense direct current is required, say 150 amperes, and a great current density. The positive crater must be brought to an extremely high temperature. It also seems necessary to have the carbons impregnated with certain salts. The radiation coming from the crater should be used.

The mercury quartz lamp gives a spectrum which consists mainly of a series of lines with great intensity. Some of these lines lie in the ultra-violet and this part of the radiation is relatively intense. The mercury quartz lamp is therefore a good source for ultra-violet radiation and is especially useful for treatment of rickets and certain skin diseases.

An ordinary electric bulb does not give off any ultra-violet radiation. It also must be remembered that the ultra-violet radiation does not penetrate ordinary glass. There are some substitutes for glass windows in the market which, it is claimed, let through the ultra-violet radiation. I do not know how good they are as I have not seen reports of reliable tests except for one English glass (vitaglass) which is fairly good. The Corning Glass Works have produced a glass which is very transparent for ultra-violet light. As yet this glass has only been made in small pieces with rough surfaces, but it undoubtedly soon will be made in satisfactory shape so that it can be used instead of ordinary window glass.

Heliotherapy is becoming more and more recognized. Very good results have been obtained with it in surgical tuberculosis both by Rollier and others. About eighty per cent of the patients treated have been cured. It must be remembered that the radiation received from the sun varies very much, both quantitatively and qualitatively. The ultra-violet part of the radiation is absorbed to a certain extent by the air. This part of the radiation is therefore much more intense at high than at low altitudes. At the seashore the radiation is increased because of the reflection from the water. The shortest wave length that reaches the surface of the earth is about 2900 Å. These short waves reach the surface only at certain parts of the globe and only at certain times of the year and the day. The sun has to be fairly high in the sky, otherwise the rays have so much air to pass through that an essential part of the ultra-violet radiation is absorbed. The rule that only a small part of the body should be exposed for a short time during the first sun bath and that the area should be increased from day to day and also the time for the previously treated area, is good. It seems, however, at least as important that the intensity and spectral distribution of the radiation be measured during treatment. These factors may change very much from hour to hour and from day to day. The temperature, the wind velocity and the humidity also should be measured, as the effect of the bath depends to a great extent upon these physical conditions and they may be such that the bath will do more harm than good.

I have already mentioned that ordinary window glass shuts out the ultra-violet radiation, but that it soon may be possible to get a new kind (Corning 980 A) which will let through practically all the ultra-violet radiation present in the sunlight and sun baths can thus be given behind a window.

Carbon arc light can be used to great advantage at places and at times where or when the solar radiation is insufficient. Reyn and Ernst, from the Finsen Institute, reported some remarkable results with their carbon arc lamps in 1919, healing eighty-four per cent of the patients treated (Strahlentherapie X, p. 314), and Reyn, Collin and Christensen described last year in Acta Radiologica (IV, p. 1) the technic and armamentarium they used. O'Brien at the J. N. Adams Memorial Hospital, Perrysburg, N. Y., has recently constructed a very powerful carbon arc lamp (150 amperes) which is in use there for treatment of patients. The indications are that just about as good results will be obtained with help of this lamp as with the sun. The same precautions must be taken with respect to temperature, ventilation, humidty and the reaction of the individual patient as when sun baths are given. It may be possible some day to construct a lamp that is still more effective, but we will have to know first which wave length is most important for the treatment.

Note: Since this paper was read several articles have appeared in print giving measurements on the transparency to ultraviolet light of substitutes for ordinary window glass and on the spectral distribution of light from certain carbon arc lamps.

INFECTIOUS MONONUCLEOSIS

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Infectious mononucleosis is characterized by adenopathy, splenic enlargement, fever, leukocytosis, a pronounced lymphocytosis, and the presence of abnormal mononuclear lymphoid cells in the circulating blood. The condition resembles in many respects the early stages of lymphatic leukemia, but is distinguished from leukemia by a benign course terminating in recovery and by the type of lymphoid cell which dominates the blood picture. Though of comparatively rare occurrence, infectious mononucleosis forms a symptom-complex of considerable importance, especially in its relation to, and differentiation from, the leukemias.

So closely may the clinical features, total leukocyte counts, and the height of the lymphocytosis in infectious mononucleosis and acute lymphatic leukemia resemble each other, that without a careful cytological study of the blood early differentiation may be impossible.

Case 1.—G. H., white female, single, aged 23, seen with Dr. S. E. Stinnette on April 30, 1925, complaining of swollen glands of the neck, fever, bleeding from the gums, and weakness. Except for measles and pertussis in childhood, and tonsillectomy in 1923, her past history was negative. The family history was unimportant. The present illness had started about ten days previously. She had felt weak and tired, the glands of the neck had become swollen and tender, the gums bled easily, and there had been an evening rise of temperature averaging 100°. There had also been a dull ache in the upper abdomen, and the bowels were constipated.

Physical examination showed a well nourished young woman. The skin and mucous membranes were pale. The gums were swollen, spongy, and bled on the slightest pressure. The cervical, submaxillary and axillary glands were considerably enlarged, soft, and tender. The spleen was enlarged, the lower pole descending 5 cm. below the costal margin. The liver was also enlarged, its lower border being 9 cm. below the costal margin. Remainder of physical examination negative. Temperature 100°. The blood examination on this date was as follows: Hemoglobin 70 per cent, red blood cells 4,460,000, leukocytes 21,000, polymorphonuclears 4 per cent, lymphocytes* 96 per cent. Other laboratory findings were negative.

The case at this stage of the observation, with bleeding gums, adenopathy, splenic enlargement, fever, a leukocytosis of 21,000, and a lymphocytosis of 96 per cent, might well, therefore, have been considered acute lymphatic leukemia with a fatal outcome to be faced. A careful cytological study of the blood, however, revealed that the prevailing lymphocyte, though not of the type found in normal blood (see colored plate), was by no means the undifferentiated immature lymphoid cell which characterizes acute lymphatic leukemia. This very important detail settled at once a vital question for this young woman, placing her in the group of infectious mononucleoses, and justifying a prediction of complete recovery.

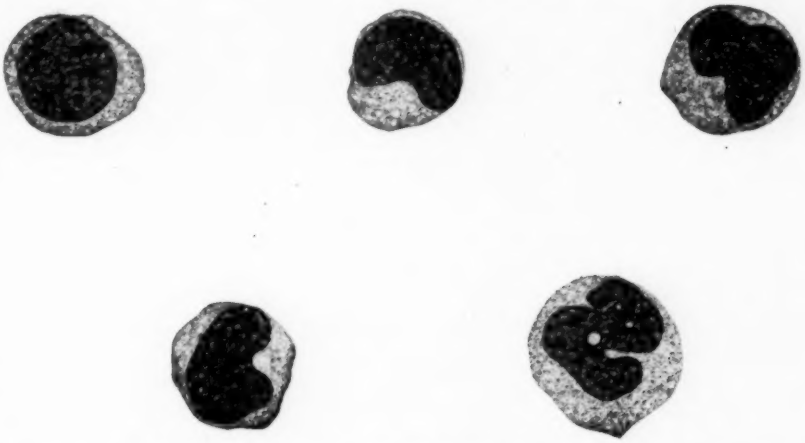
The patient was admitted to the Miller Hospital on May 1, 1925. The spleen and liver gradually receded, and by the end of the third week they could barely be felt at the costal margin. The temperature rose daily to 100° or 101° for a month, after which it did not exceed 99°. The oozing from the gums entirely ceased in the course of a month. The adenopathy remained unchanged until the fourth week, when there was an increase in the size of the cervical and axillary glands as well as the appearance of a new glandular swelling, the size of a bean and very tender, at the angle of the jaw. The lymphocytes, which had been dropping, again showed a rise on this occasion. Following this exacerbation there was a gradual subsidence of the adenopathy. By the eighth week the glands were very much smaller, the spleen and liver could no longer be felt, the gums were firm, and the patient felt entirely recovered. Three months after the onset of the illness, although the lymphocytes were still somewhat elevated, the adenopathy had entirely disappeared, the spleen was not palpable, and the patient had gained seven pounds in weight.

The blood counts in this case from the second day in hospital until the date of the last observation three months later, are shown by curves in Figure 1. It will be noted that the total number of leukocytes dropped from 21,000 (the count on the day before entrance to hospital) to 8,500 in five days, and from then on continued to decline until they reached the low point of 2000 by the end of the fourth week, after which they slowly returned to a normal number. The percentage of the lymphoid cells dropped very slowly. At the end of the first week when the total leukocyte count was 8,000, lymphocytes constituted 86 per cent of them. In the fourth week the lymphocytes reached their lowest level, 40 per cent, and thereafter fluctuated between 45 and 60 per cent. As the hemoglobin and red cell curves show, no anemia developed.

This case particularly emphasizes the importance of the detailed cytologic study of the blood pointed out by Downey,[1] whose excellent contribution to the subject in 1923 cleared up much of the confusion and difficulty which had hitherto

*The term "lymphocyte" in this and subsequent blood examinations includes all lymphoid cells.

occurred in separating infectious mononucleosis from leukemia. Cabot,[2] in 1913, in reporting four cases of lymphocytosis due to acute infection, had observed that the "lymphocytosis was so pronounced as to suggest lymphatic leukemia." Hall's[3] case in 1915, which he considered an acute leukemia with recovery, may well have been an example of infectious mononucleosis. Cross,[4] in 1922, in reporting three cases of "conditions simulating an acute benign leukemia" believed that "the clinical course of the affection alone establishes its true character." Similarly, Bloedorn and Houghton,[5] Sprunt and Evans,[6] and others have been impressed with the difficulty which may arise, especially clinically, in distinguishing infectious mononucleosis from early lymphatic leukemia. Downey[1] is convinced that failure to recognize the significant importance of the atypical mononuclear lymphoid cell, which is the outstanding characteristic of the blood picture in infectious mononucleosis, has been responsible for most of the diagnostic difficulties. The following case of infectious mononucleosis illustrates the difficulty which may be encountered in the diagnosis, especially at the time of the first blood examination:



Types of abnormal lymphoid cells seen in infectious mononucleosis, from the blood of Case 1. These cells are larger than normal lymphocytes, their cytoplasm is quite deeply basophilic and often vacuolated, the nuclei are frequently eccentrically placed and are usually indented or lobulated, the nuclear chromatin forms a heavy network, and nucleoli are rare.

Case 2.—M. B., white female, aged 18, was first seen on August 3, 1921, complaining of fatigue, weakness, soreness of the throat, and fever. Her past history was negative except for frequent "colds." The family history was unimportant. Her present symptoms had started two weeks previously. She had felt tired and weak and had fainted on two occasions. There had been some soreness of the throat, and for a week she had had an evening temperature averaging 100°.

Physical examination revealed a well nourished young woman; skin and mucous membranes pale; cervical glands swollen and tender; throat slightly injected; spleen palpable at costal margin; temperature 99.4°. The blood examination on this date was as follows: hemoglobin 80 per cent, red blood cells 4,310,000, leukocytes 14,000, polymorphonuclears 13 per cent, lymphocytes 84 per cent, large mononuclears 3 per cent. The lymphocytes were reported to be "largely young irritation forms suggesting rapid formation," thus occasioning grave concern that the case might be one of early leukemia. A further careful cytological study of the blood, however, showed that although the prevailing lymphoid cells were abnormal they were not the immature cells of acute leukemia. The other laboratory examinations were negative.

The fever in this case persisted for another five days, averaging 100° in the evening. At the end of a week the spleen was still palpable but the cervical adenopathy was subsiding and the lymphocytes had dropped to 40 per cent. One month later the cervical adenopathy had entirely disappeared, there was no fever, the spleen was no longer palpable, and the lymphocytes had dropped to 28 per cent (Fig. 2).

This case is a very typical one of infectious mononucleosis. The onset was associated with a mild throat infection, while cervical adenopathy, splenic enlargement, fever, a moderate leukocytosis, and a marked lymphocytosis of a characteristic type were the outstanding features. The disease ended in complete recovery after a course of four weeks. Four years later an ex-

amination of this patient showed no adenopathy, the spleen was not palpable and the blood picture was entirely normal.

The next case of infectious mononucleosis is very similar to the preceding one, but with a very generalized adenopathy and a higher fever it was even more suggestive clinically of acute leukemia:

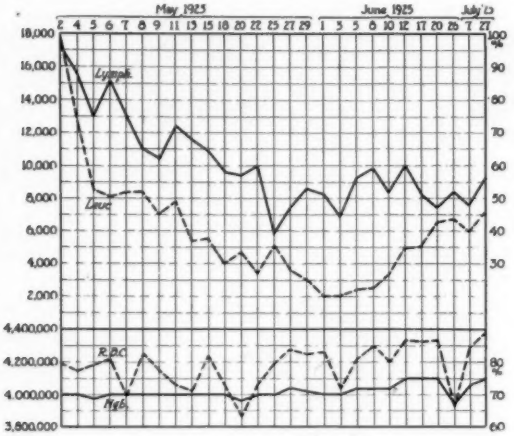


Fig. 1. Blood counts in Case 1.

Case 3.—E. P., white male, single, aged 18, was referred to me on June 23, 1922, because of swollen, painful glands, and fever. Except for tonsillectomy ten years before, his past history was negative. The family history was unimportant. His present illness had started ten days previously with tender, swollen glands of the neck, in the axillæ, and in the groins. The adenopathy was accompanied by fever, which for the past four days had ranged from 100° to 102.5°. He had had a moderate soreness of the throat with slight headache, loss of appetite and general malaise.

Physical examination revealed a well nourished young man. The throat was somewhat reddened and injected. The cervical, axillary, epitrochlear, and inguinal glands were all considerably enlarged, firm and tender. The spleen was readily palpable at the costal margin. Temperature 101°. Remainder of physical examination negative. The blood on this date (Fig. 3) was as follows: hemoglobin 78 per cent, red blood cells 4,480,000, leukocytes 16,800, polymorphonuclears 33 per cent, lymphocytes 67 per cent. Other laboratory findings negative.

As the prevailing lymphocytes in this case, though abnormal, were not undifferentiated immature cells, acute lymphatic leukemia was ruled out and a favorable prognosis given. Complete recovery took place in the course of four weeks, with a gradual subsidence of the adenopathy, fever and other symptoms. On examination one year later there was no adenopathy, the spleen was not palpable and the blood was normal.

The following case is particularly interesting because of its long duration, resembling those reported by Herman and Bass[7] in children, in which the adenopathy and lymphocytosis persisted for several months, thereby raising the question of a chronic lymphatic leukemia. The lymphoid elements in this patient's blood showed departures from the normal typical of infectious mononucleosis (see plate) but at no time suggestive of possible leukemic features:

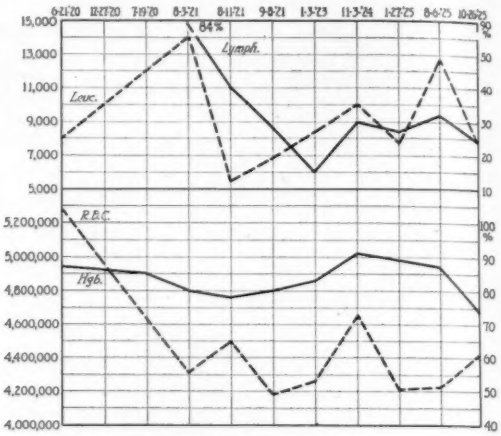


Fig. 2. Blood counts in Case 2.

Case 4.—H. V. B., white female, aged 20, referred on December 29, 1925, because of unexplained fever. She had had measles, pertussis and scarlet fever in childhood, and influenza in 1918. Her tonsils had been removed in 1923. The family history was unimportant. Her present illness was of about a month's duration. She had been losing weight, was easily fatigued, had had repeated "head colds" and every evening had a temperature of 100 to 101°. She, however, had not felt ill enough at any time to discontinue her studies at school.

Physical examination showed a well nourished young woman. The skin and mucous membranes were somewhat pale. There was a slight enlargement of the cervical lymph glands. The spleen was enlarged, its lower pole being palpable 4 cm. below the costal margin. The remainder of the physical examination was negative. X-rays of the chest were negative. The blood examination was as follows: hemoglobin 74 per cent, red blood cells 4,000,000, white blood cells 9,450, polymorphonuclears 27 per cent, lymphocytes 73 per cent. Among the lymphocytes were a moderate number of large, atypical cells. Other laboratory examinations were negative. She continued to run an evening temperature of 99.5 to 100° for approximately two months, after which it remained normal. The spleen gradually receded until it was no longer palpable. There were no further glandular enlargements,

and the cervical adenopathy gradually subsided. The course of the lymphocytosis is shown in Fig. 4.

As is well known, lymphocytosis is not an uncommon finding in the blood of apparently normal children. Furthermore, in childhood many

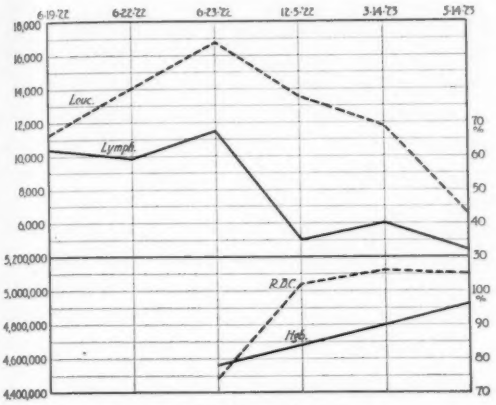


Fig. 3. Blood counts in Case 3.

conditions may be accompanied by a lymphocytosis, notably pertussis, congenital syphilis, tuberculosis, typhoid, rickets, scurvy, varicella, etc. The following case is cited for purposes of comparison with the four preceding cases to show that adenopathy and lymphocytosis do not alone constitute a diagnosis of infectious mononucleosis:

Case 5.—M. H., white female child, aged 7, was brought to the Miller Clinic for an examination July 8, 1924. Her tonsils had been removed in 1921. She had had measles and pertussis in the spring of 1924. Her father has syphilis, for which he is undergoing treatment. Her mother is well, has had no miscarriages, and no other pregnancies. The child has always been healthy but was born prematurely at eight months and as a baby was given mercury rubs.

Physical examination showed a well developed, healthy appearing child. The cervical, axillary and inguinal glands were all considerably enlarged, firm, not tender. The liver edge was just palpable. Examination otherwise was negative. There was no fever. The Wassermann was negative. The blood at the first examination was as follows: hemoglobin 75 per cent, red cells 4,120,000, leukocytes 8,500, polymorphonuclears 51 per cent, lymphocytes 47 per cent, large mononuclears 2 per cent.

Ten months later (May, 1925) the child was again brought to the clinic. She had been very well in the interval. The cervical, axillary and inguinal glands were still enlarged. The liver was palpable at the costal margin. Other physical findings were negative. There was no fever. The Wassermann was again negative. The blood now showed a pronounced lymphocytosis, as follows: hemoglobin 71 per cent, red cells 4,570,000, leukocytes 7,400, polymorphonuclears 15 per cent, lymphocytes 84 per cent.

Ten months later (March, 1926) the adenopathy had subsided, except for a very slight enlargement of the posterior cervical glands, and the lymphocytes had

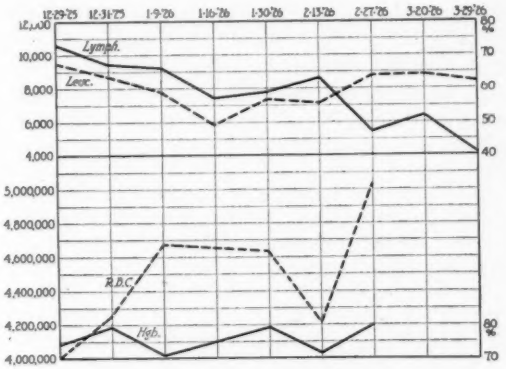


Fig. 4. Blood counts in Case 4.

dropped to 50 per cent of the total leukocyte count (Fig. 5).

In this case infectious mononucleosis, as well as chronic lymphatic leukemia, can of course be readily ruled out, as the lymphoid cells through-

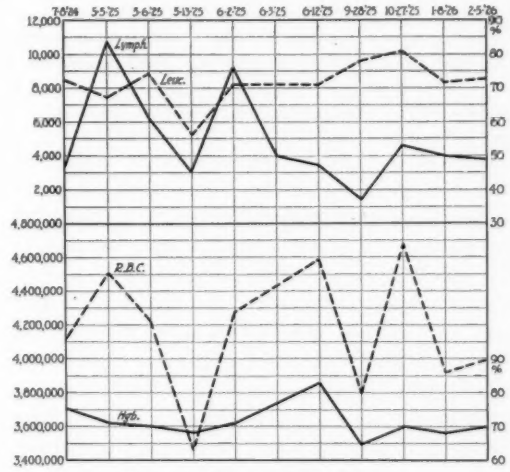


Fig. 5. Bloor counts in Case 5.

out an observation extending over a period of almost two years never showed any departure morphologically from the large and small lymphocytes of normal blood and, furthermore, there had been no leukocytosis, no fever, nor any enlargement of the spleen. The exact cause of the lymphocytosis and adenopathy in this child is obscure without proof of inherited syphilis and the

improbability of paternal transmission with no evidence of maternal infection.

The following case of acute lymphatic leukemia is also presented for purposes of contrast with the four cases of infectious mononucleosis, and to again emphasize the importance of the morphologic study of the blood in the differential diagnosis:

Case 6.—W. M., a white male, married, aged 28, came to the Miller Clinic on January 4, 1926, complaining of aching in the legs and fatigue. Except for measles and pertussis in childhood his past history was negative. The family history was unimportant. Seven weeks previously he had fallen ten feet from a scaffold, but was not rendered unconscious and did not have enough pain to prevent him from going on with his work. About a week later he began to be troubled with generalized aching pains in the legs and through the muscles of the neck. He has felt tired and rather weak. His appetite has been poor, bowels constipated, and he has lost weight. He has had several mild nosebleeds, but no bleeding from any other source. For the last two weeks he has had an evening rise of temperature, on one or two occasions reaching as high as 102°.

Physical examination showed a somewhat undernourished male. The skin and mucous membranes were slightly pale. His tonsils were injected. The cervical, inguinal and femoral glands were moderately enlarged, firm, not tender. The spleen and liver were not palpable. Temperature 99.6°. Remainder of the physical examination was negative. The blood count was as follows: hemoglobin 70 per cent, red blood cells 4,060,000, leukocytes 8,150, polymorphonuclears 18 per cent, lymphocytes 82 per cent.

It is to be noted in this case that at the time of the first observation there was no anemia, no leukocytosis, and that, although the increase in lymphocytes was marked, the lymphocytosis was not as high as in cases 1 and 2 of infectious mononucleosis. However, a morphologic study of the prevailing lymphocytes showed them to be the immature, undifferentiated type characteristic of acute lymphatic leukemia, thereby at once sealing the fate of this young man. From then on the case ran the usual course of this disease, with death in ten weeks (Fig. 6).

The term "infectious mononucleosis" is not an altogether satisfactory one, as although the condition presents all the features of an infection, its infectious nature is yet to be proven, and furthermore, a mononucleosis (lymphocytosis) may occur, as has been noted, in a number of infections, especially in childhood. Infectious mononucleosis, however, has been the name most generally adopted to describe the symptom-complex since Sprunt and Evans[6] employed it in 1920. In 1889 Pfeiffer[8] under the term "glandular fever" described an epidemic of adenitis with fever, in children. There followed a number of reports on glandular fever, notably the epidemic

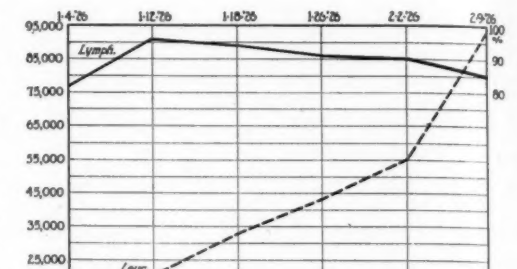


Fig. 6. Blood counts in Case 6.

described in 1896 by West.[9] Tidy and Morley[10] in 1921, after an analysis of the reported cases of glandular fever, concluded they were identical with infectious mononucleosis but because of the absence of complete blood studies in the earlier reports, actual proof that the two conditions were the same was lacking. In 1925 Bass and Herman[7] concluded that infectious mononucleosis is a definite syndrome "closely related to glandular fever." Other names have been used to describe the condition; thus Bloedorn and Houghton[5] suggested "acute benign lymphoblastosis," while Downey and McKinlay[1] designated it "acute lymphadenosis." This multiplicity of terms is unfortunate, and were it not for the lack of proof that the condition is the same as glandular fever, a continuance of the older name would be simpler. However, under the circumstances, it is probably advisable, especially for purposes of ready reference, to group all cases under "infectious mononucleosis."

The key to the diagnosis of infectious mononucleosis lies in the recognition of the pathological lymphoid cells which give to the blood in this

condition its distinctive feature. These cells have been described by Downey,[1] Longcope,[11] and others.[5, 6] They were present in large numbers in cases 1, 2 and 3, and to a less extent in case 4. The plate accompanying this article was made from the blood of case 1 and shows typical representative cells of infectious mononucleosis. These cells bear no relation to the large mononuclears of normal blood. They are very rarely, or never, seen in the blood of normal persons and are not a feature of the simple lymphocytoses of childhood, thus they were not present in the case of lymphocytosis cited in a child (Case 5). The predominating cell in infectious mononucleosis varies somewhat in size but the majority are considerably larger than normal large lymphocytes. The cytoplasm of the cell is quite deeply basophilic, usually fairly liberal in amount, and often vacuolated. The nuclei are often placed eccentrically in the cell and are usually indented or lobulated. The nuclear chromatin is dense and forms quite a heavy network. Nucleoli are rare. Downey[1] lays special emphasis on the "coarse network of heavy strands and masses" of the nuclear chromatin in these cells, which distinguish them sharply from the cells of acute lymphatic leukemia with the "diffuse sieve-like arrangement of chromatin" in their nuclei and the presence of nucleoli.

CONCLUSIONS

(1) Infectious mononucleosis (glandular fever) is a distinct clinical entity which runs a benign course terminating in recovery.

(2) Four cases of infectious mononucleosis in young adults are presented with, for purposes of comparison, a case of simple lymphocytosis and a case of acute lymphatic leukemia.

(3) Because of the similarity which may exist, especially at the onset, in the clinical features and blood counts in infectious mononucleosis and acute lymphatic leukemia, confusion may occur if a diagnosis is based solely on these findings.

(4) The key to the diagnosis of infectious mononucleosis is the abnormal lymphoid cell which dominates the blood picture.

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INTERNATIONAL HEALTH INSTITUTE

During the past few months the medical profession has been flooded with letters from the "International Health Institute, Inc.," 2061 Broadway, New York City. According to its "sales talk," the International Health Institute purposes to sell to the public a urinalysis and periodic physical examination service "supplemented with a complete course in body-building and rules of right living." While this is the nominal *raison d'etre* of the concern, evidence is accumulating to confirm the suspicion that the International Health Institute, Inc., is primarily a promotion scheme. Letters are sent to physicians stating that the "Institute" desires to establish "a resident physician and member of our Advisory and Hygiene Reference Board"; invites the physician to join and to purchase stock. It is stated that the first source of income is the service that is to be recommended by the International Health Institute in selling to the public a periodic physical examination and urinalysis, for which the institute will charge $37.50, but it is explained that a greater opportunity for financial betterment will come from the activities of the International Health Institute in recommending to the lay subscribers that they use certain health foods; certain "approved exercising devices"; certain "hygienic appliances"; and certain books all of which the institute will sell. (Jour. A. M. A. April 30, 1927, p. 1435.)

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES
Neonal

CERTIFIED LABORATORY PRODUCTS
Ethylene-C. L. P.

CUTTER LABORATORY
Alkali Weed Pollen Extract-Cutter
All Scale Pollen Extract-Cutter
Box Elder Pollen Extract-Cutter
Burning Bush Pollen Extract-Cutter
Corn Pollen Extract-Cutter
Foxtail Pollen Extract-Cutter
Mountain Cedar Pollen Extract-Cutter
Tumbleweed Pollen Extract-Cutter
Western Water Hemp Pollen Extract-Cutter

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E. R. SQUIBB & SONS
Ovarian Hormone-Squibb

SWAN-MYERS CO.
Ampoules Ephedrine Hydrochloride - Swan - Myers, 0.05 Gm., 1 c.c.
Capsules Ephedrine Hydrochloride - Swan - Myers, 0.025 Gm.
Solution Ephedrine Hydrochloride-Swan-Myers, 3%

TRUTH ABOUT MEDICINES

Viking Palatable Cod Liver Oil.—Cod liver oil containing 0.2 per cent of benzaldehyde. Its fat soluble vitamin A content is such that 0.002 Gm. per day is sufficient to initiate growth in the albino rat. Sigurd E. Roll, Chicago.

Rabies Vaccine-U. S. S. P. (Semple Method).—An antirabic vaccine (New and Non-official Remedies, 1927, p. 347) prepared according to the general method of David Semple (phenol killed). Marketed in packages of fourteen syringes, each containing 2 c.c. The content of a syringe is administered daily over a period of fourteen days. United States Standard Products Co., Woodworth, Wis. (Jour. A. M. A. May 21, 1927, p. 1637.)

Ampoules Ephedrine Hydrochloride-Swan-Myers, 0.05 Gm., 1 c.c.—Each ampoule contains 0.05 Gm. of Ephedrine Hydrochloride-Swan-Myers (Jour. A. M. A., April 16, 1927, p. 1235) in 1 c.c. Swan-Myers Co., Indianapolis.

Capsules Ephedine Hyrdochloride-Swan-Meyers, 0.025 Gm.—Each capsule contains 0.025 Gm. of Ephedrine Hydrochloride-Swan-Myers (Jour. A. M. A., April 16, 1927, p. 1235). Swan-Myers Co., Indianapolis.

Solution Ephedrine Hydrochloride-Swan-Myers, 3%.—A 3 per cent solution of Ephedrine Hydrochloride-Swan-Myers (Jour. A. M. A., April 16, 1927, p. 1235), preserved with chlorbutanol 0.5 per cent. Swan-Myers Co., Indianapolis.

Ovarian Hormone-Squibb.—A sterile, aqueous solution representing the physiologically active principle of the whole ovary. It is standardized in terms of its effect on spayed albino rats, one rat unit being the quantity necessary to induce estrus as judged by the smear method within three days in an ovariectomized, sexually mature rat weighing approximately 140 Gm. Ovarian hormone-Squibb is administered by hypodermic injection. For recent cases of amenorrhea, artificial or natural menopause, from 50 to 100 units is given in a series of injections over a period of from three to five days. For long existing cases of amenorrhea, artificial or natural menopause, much larger doeses may be administered. Ovarian Hormone-Squibb is supplied in 5 c.c. vials. each cubic centimeter representing 10 units. E. R. Squibb & Sons, New York. (Jour. A. M. A., May 28, 1927, p. 1713.)

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EDITORIAL

Skin Grafts

The free transplantation of a superficial or the full thickness of the skin may be resorted to to fill a surface defect of skin or mucosa which has been or will be healed by scar. With proper precautions, skin can be successfully grafted upon a primary raw surface, upon a freshened scarred surface, or upon a healthful granulating surface; but a higher percentage of takes on the latter will occur if the granulations are removed down to or through the newly forming scar base. Other things being equal, very thin grafts are better suited to places liable to contamination, such as a granulating surface or grafts placed within the mouth. Davis has lately simplified the academic discussion of this subject by suggesting the elimination of the terms, Thiersch graft, Wolff graft, full thickness graft, etc., and using the comparative terms of thin and thick grafts.

A graft carrying very little derma is more apt to take, but will contract more than one that carries a greater thickness of the true skin. A graft is more apt to take if applied under its normal lateral tension. This applies particularly to the thicker grafts. A thin graft may be applied on a freshened scar with little subsequent contraction, but if applied to fresh movable tissue will contract 60 per cent or more unless prevented by lateral tissue tension. The thin graft will eventually average whiter than the natural skin, while the thicker graft is more apt to acquire excessive tan, greatest in the dark skinned; the normal pink color is usually absent or lessened on the grafted surface, but the appearance of an extensive scar can often be much improved by superficial decortication and the application of a large, moderately thin graft. This latter may not be of natural color, but it will be more or less smooth and will hold cosmetics; the scar will not. "Port wine" stains can be improved by slicing off the epithelium with an outer layer of derma and applying thin grafts carrying some derma. As Eitner has pointed out, the derma may have its epithelium removed and, carrying a layer of fat, can be very successfully grafted subcutaneously to fill up a hollow place. The derma seems to serve as an intermediary for the blood supply, which the fat seems incapable of acquiring of itself.

While there are many reported successes of homo- and zoo-grafts, a few quite convincing, still it is better to use auto-grafts wherever possible. It is putting it conservatively to say that they are less apt to be disappointing.

Much of the voluminous literature of the semi-recent past on the technic of skin-grafting is not very helpful. The important points bearing on the success or failure of the graft are the resistance of the patient, a properly prepared raw surface, absence of virulent contamination, elimination of blood clots, a graft applied and held in place under proper tension and pressure, and control of the secondary infections that may so easily destroy a recent graft which has already taken.

The details of technic will vary with the location and the kind and purpose of the graft; but if the above points are applied in conjunction

with good judgment in the selection of the type of case to be grafted and the type of graft to use, then "skin-grafting" will prove a useful and happy addition to our bag of surgical tricks.

V. P. Blair, M.D.

Glandular Fever (Infectious Mononucleosis)

Since glandular fever was described by Pfeiffer in 1889 under the name of Druesenfieber numerous articles and reports have appeared on the subject in both the English and German medical literature. In spite of this some able clinicians have refused to make the diagnosis or admit its entity. Doubtless this is because glandular fever shows such variations in onset, course and severity and clinically its differentiation from other acute infections (notably scarlet fever, diphtheria and tonsillitis) is oftentimes so difficult. Many cases are undoubtedly diagnosed la grippe. To one who has recognized textbook examples of the various types of glandular fever—the mild, severe, acute and recurrent forms, all with febrile reactions and more or less cervical adenitis—no doubt as to its existence as an entity remains.

Since 1920 when Sprunt and Evans described infectious mononucleosis, an acute febrile disease involving the glandular structures particularly and characterized by a relative and absolute increase in the mononuclears in the blood, some of unusual appearance, numerous similar reports have been published. Dr. Richards' article in this issue of the journal adds four more cases to the literature. The importance of the recognition of the true nature of these cases lies in their differentiation from acute lymphatic leukemia, a fatal disease, the diagnosis of which depends entirely upon the cytological findings.

The opinion has gradually been taking form that glandular fever and infectious mononucleosis are the same disease. Descriptions of the two conditions as to symptoms, onset and prognosis are identical. No evidence has been offered that glandular fever exists without a lymphocytosis. In fact a few reports have appeared in the last five or six years which indicate there is a leukocytosis and a relative and an absolute lymphocytosis in some stage of glandular fever. Tidy and Daniel (Lancet, July 7, 1923) and Baldridge et al (Arch. Int. Med., Oct., 1926) are of the opinion that in every respect, clinically and cytologically, the two conditions are the same. The blood pictures found varied with the stage of the infection, some cases showing a polymorphonuclear leukocytosis at the onset and even a leukopenia during convalescence. But at some stage the lymphocytosis and unusual mononuclears described in infectious mononucleosis were seen in the glandular fever cases.

This is a question of course for the hematologists to settle. If the two conditions prove to be identical, which seems likely, the older name, glandular fever, is fully as descriptive as the term infectious mononucleosis and should be maintained.

OBITUARY

Dr. Hubert A. Pinault

Dr. H. A. Pinault, for 38 years a practicing physician at St. Joseph, Minnesota, died May 21, 1927, at the age of 72 years. Death was due to apoplexy.

Hubert A. Pinault was born in Rimouski, Quebec, Canada, in 1855. His early education as well as medical training were received in Canada, where he obtained his degree at Laval University in 1883. Dr. Pinault practiced medicine at Osseo and Red Lake Falls, Minn., prior to the establishment of his practice in St. Joseph, where he was actively engaged in practice until two days before his death. He was coroner for 30 years in Stearns County, resigning Jan. 1, 1927.

Dr. Pinault was an honorary member of his county and state medical societies, consulting staff member of St. Raphael's Hospital, St. Cloud, Minn., and advisory physician to St. John's University, Collegeville, Minn.

He leaves to mourn him his wife, two sons, three daughters and several grandchildren.

Dr. T. W. Hammond

T. W. Hammond, a practicing physician in Le Sueur county, Minnesota, for many years, who later became one of the most prominent attorneys in the West, died March 11, 1927, at his home in Tacoma, Washington, at the age of seventy-six.

Dr. Hammond was born in Massachusetts. He studied medicine at the University of Michigan and Jefferson Medical School in Philadelphia. Following graduation he practiced medicine at Montgomery, Minnesota from 1874 to 1880. He decided at that time to give up his medical practice and undertook the study of law. He followed this profession in Minnesota from 1881 to 1889, when he moved to Tacoma. He gained prominence in the legal profession in that city

and had been a United States Commissioner for the seven years preceding his death.

Besides his medical and law practice Dr. Hammond also devoted considerable time to the writing of books and short stories. One of his books, "On Board a Whaler," founded upon his sea experiences when eighteen years old, has been termed a striking novel of adventure.

Dr. Hammond is survived by his wife, one son and two daughters, all residing in Tacoma.

OF GENERAL INTEREST

Dr. A. W. Jones of Red Wing has been appointed health officer of his city, succeeding Dr. M. W. Smith.

Dr. Grace Gardner Smith, of Red Wing, was recently elected president of the Board of Education of Red Wing.

Dr. H. M. Knudtson has disposed of his practice at Browerville, Minnesota, and is now located at Norwood, Ohio.

Dr. W. H. Bueerman has opened offices at 1015 Corbett Building, Portland, Oregon, for the practice of surgery.

Dr. J. J. Swendson of Saint Paul was chosen president of the Saint Paul Lions club at the annual election held last month.

Dr. Leo G. Rigler of Minneapolis has been appointed roentgenologist and associate professor at the state university hospital.

Miss Mary C. Hoy and Dr. Edward A. Regnier of Minneapolis were married in June. Dr. and Mrs. Regnier will make their home in Minneapolis.

Dr. H. Walter Huseby, who has been practicing medicine at Waterville, Minnesota, has become associated with Dr. R. M. Eppard of Cloquet.

Dr. and Mrs. Emil S. Geist of Minneapolis and their three children will spend the summer touring Europe. They sailed from New York, June 18.

Dr. H. F. Wiese, who was formerly with the Sivertsen Clinic, Minneapolis, has opened offices for private practice at 701 Physicians and Surgeons Building.

Dr. Leon J. Tiber of Saint Paul has returned from Europe, and has resumed his practice at 214 Hamm Building. Dr. Tiber is now specializing in gynecology and obstetrics.

Plans are under way for the construction of a nurses' home for Fairview hospital in Minneapolis, to cost approximately $150,000, according to an announcement made late in May.

Dr. R. V. Taylor, formerly of the Mayo Clinic, who has just returned from China, is now established at 58 St. Emanuel Street, Mobile, Alabama, for the practice of surgery.

Dr. H. Longstreet Taylor of Saint Paul was elected president of the National Tuberculosis Association at the recent annual meeting of that organization held at Indianapolis.

Miss Elizabeth Lyle Bacon, daughter of Dr. and Mrs. Lyle C. Bacon of Saint Paul, became the bride of Dr. Howard Y. Williams, pastor of the People's Church, Saint Paul, Tuesday, June 14.

Dr. J. C. Litzenberg of Minneapolis was unanimously elected chairman of the Section on Obstetrics and Abdominal Surgery of the American Medical Association at the meeting held at Washington, D. C., in May.

Dr. W. W. Covell of St. Peter, Minnesota, has purchased a building on the corner of Park Row and Third street to be remodeled at once into a modern hospital. The hospital is to be open to all physicians and to the public.

Dr. and Mrs. W. J. Mayo, Dr. and Mrs. D. M. Berkman and Dr. and Mrs. Waltman Walters sailed May 21 on the Leviathan for England. The doctors expect to visit medical clinics in England and Paris before their return, July 10th.

Dr. R. W. Browne, who has been in charge of the Aberdeen Hospital, St. Paul, for the past fifteen months, has been appointed head of the United States Veterans Bureau hospital at Fort Bayard, New Mexico, where he took up his duties in June.

Dr. J. D. Camp has received the appointment of consulting roentgenologist to the new Palmer Memorial Hospital for Cancer in Boston. It is the newest addition to the Deaconess' Hospital group. Dr. Camp will be in charge of *x*-ray therapy.

Dr. Charles William Mayo, son of Dr. and Mrs. Charles H. Mayo of Rochester, and Miss Alyse Varney Plank of Collingdale, Pennsylvania, were married Saturday, June 25, at the home of the bride's parents. Dr. and Mrs. Mayo will make their home in Rochester, Minnesota.

Dr. John L. Rothrock of Saint Paul has been named head of a campaign to raise $3,050,000 for the University of Pennsylvania medical school. Graduates are raising the fund for use in the further development of the various units of the university for medical education and service.

Announcement has been made of the marriage of Miss Leone Marie Dennis of Marquette, Michigan, to Dr. Leo Courtney Culligan of Saint Paul. The wedding was solemnized Wednesday, June 1. Dr. and Mrs. Culligan will be at home in their new home on Sibley Memorial highway after August 1.

Word has been received that the John Horsley Memorial Prize will be awarded to Dr. C. B. Morton at the commencement exercises of the University of Virginia. The prize, consisting of $1,000, was established in February, 1925, by Dr. J. Shelton Horsley of Richmond, Virginia, as a memorial to his father, Mr. John Horsley.

On May 26 Dr. J. A. Myers of Minneapolis read a paper before the twenty-third annual meeting of

the National Tuberculosis Association of Indianapolis. On the twenty-eighth of May he appeared before the Wisconsin Anti-Tuberculosis Association in Milwaukee, and that evening presented another paper before the Milwaukee Academy of Medicine.

The American Board of Otolaryngology conducted an examination at Washington, D. C., on May 16 and 17, and at Spokane, Washington, on June 4. Of the 142 men examined at Washington, D. C., 119 were passed and 23 failed to pass the examination. In Spokane, the number passed was 46, and the number failed was 6.

The next examination will be held in Detroit on September 12, 1927. The applications for examination should be sent to Dr. H. W. Loeb, Secretary, 1402 South Grand Boulevard, St. Louis, Missouri.

Dr. E. Z. Witzeman of the Mayo Clinic and Dr. E. A. Pohle of the University of Michigan were recently appointed to the staff of the University of Wisconsin medical school. Dr. Witzeman will act as assistant professor of physiological chemistry. Dr. Pohle is to direct therapeutic work with radium and *x*-rays in the radiology division of the new Service Memorial Institute.

Dr. Herbert E. Chamberlain of New York will become head of the Minneapolis Child Guidance Clinic next fall, succeeding Dr. Smiley Blanton, who has resigned to go to Vassar College as professor. Dr. Chamberlain has been identified with the National Child Guidance Association for the past two years and has made extensive research into psychiatry in the United States and abroad.

At the recent meeting of the Association of American Physicians in Atlantic City, Dr. N. M. Keith, Rochester, was elected to active membership and Dr. W. S. Lemon to associate membership. Drs. W. C. Alvarez, C. S. McVicar and P. S. Hench were made members of the Society for Clinical Investigation. Drs. McVicar and Weir were also elected members of the American Gastro-Enterological Association.

Minnesota has the largest number of church supported hospitals per capita in the United States, according to Dr. Frank C. English of Cleveland, Ohio, secretary of the American Protestant Hospital Association, who recently visited Minneapolis in preparation for the meeting of the association in that city October 8, 9 and 10. Arthur M. Calvin, business manager of the Northwest Baptist Hospital Association, has been made general chairman for the convention.

Members of the Basic Medical Science Board, recently appointed by Governor Christianson, include the following: Dr. S. H. Boyer, Duluth, physician, to serve until April 1, 1929; Dr. Arthur E. Allen, Minneapolis, osteopath, term to April 1, 1929; Richard E. Scammon, Minneapolis, anatomist at the state university, term to April 1, 1931; Dr. E. T. Bell, Minneapolis, pathologist at the university, term to April 1, 1931, and Dr. Louis E. Coss, Willmar, chiropractor, to serve until April 1, 1933.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 13, 1927

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 13, 1927, at 8 o'clock. Dinner was served at 7 p. m.

The meeting was called to order by the President, Dr. F. E. Burch. There were 43 members and 1 visitor present.

The minutes of the March meeting were read and approved.

Dr. L. A. Nippert and Dr. H. L. Staples were elected to Honorary Membership in the Academy. Dr. C. B. Wright was elected to Active Membership from Minneapolis, and Dr. C. E. Conner to Active Membership from St. Paul.

Dr. George Douglas Head read the following memorial of the life of Dr. A. W. Abbott, a member and past president of the Academy, and a motion was carried that it be made a part of the permanent records of the Academy of Medicine:

Amos Wilson Abbott has passed on. He was one of the founders of the Minnesota Academy of Medicine and a pioneer surgeon of this State. Most men relinquish their scientific activities as advanced age creeps upon them. This was not so with Dr. Abbott. His presence in these later years at the meetings of the Academy and his participation in the discussions forcibly indicate how brightly the fires of professional interest and enthusiasm burned in his heart. It falls to the lot of but few medical men to have left behind them so honorable and useful a life history. The high quality of his scientific attainments, the lofty purpose which characterized his career and the purity of his life have endeared him to every member of the Society. It is most fitting to present to the Academy and place on our records some of the important facts of his life.

Amos Wilson Abbott was born of missionary parents in Ahmednuggar, India, January 6, 1844. When he was one year of age, he, with his native Christianized Indian nurse, was kidnapped. The natives were about to kill him when the nurse reminded them that according to an Indian supersition something dire would happen to them if they killed him before sundown. They decided to wait and the nurse stole away with him, carrying him to his parents.

He came with his parents to the United States when he was four years old and lived in Wilton, N. H. When he was seven, his parents went back to India, leaving him with an aunt who was of the old New England type, very religious and unrelenting. One day when he was twelve years old his aunt accused him of breaking a window; when he denied having done so she doubted his word, whereupon he left her home, shifting for himself from that time on. He attended Phillips Andover Preparatory School, working his way. At fifteen he entered Dartmouth College. He had been there two years when the Civil War broke out and he enlisted as a drummer boy. He was taken prisoner

and confined in Libby Prison. He escaped from there with six companions but barely missed being shot in the break for freedom. The night Lincoln was assassinated, he was in the lobby of the theater to see the President enter. He saw Booth on horseback as he escaped. After the war he earned by his own effort the money to finish his education.

Dr. Abbott received his medical education at the College of Physicians and Surgeons, N. Y. He entered practice first at Delhi, N. Y., but came to Minneapolis in 1877.

In 1880 he was married to Helen Wright of Delhi, N. Y., who with a son and two daughters survive him.

On March 5, 1902, Dr. Abbott opened the Abbott Hospital in the old double house at 10-12 East 17th St., Minneapolis, Minn. Here he continued his surgical work until 1910 when the present Dunwoody building was erected for him by Mr. Dunwoody, a life-long friend, as a token of gratitude for the operative relief given Mrs. Dunwoody. In 1914, at Mr. Dunwoody's death and at Dr. Abbott's suggestion, the Abbott Hospital was given to Westminster Presbyterian Church of Minneapolis together with the Dunwoody endowment of $100,000.

Dr. Abbott has since been the chief of staff of Abbott Hospital. He has given much of his time and strength in building up this institution which, with the gifts of Mr. T. B. Janney and Mr. O. C. Wyman, ranks among the strong hospital organizations of Minneapolis.

Dr. Abbott early in his career showed interest in medical education and taught anatomy in the St. Paul Medical College. In 1881 he assisted in founding the Minnesota College Hospital, where he was professor of anatomy and later served as professor of gynecology. He later became associated in the same capacity with the medical school of the University of Minnesota, where he taught for years, and held an emeritus professorship there at the time of his death.

In conjunction with Dr. Clarke Stewart and Dr. F. F. Wesbrook, he founded the Minnesota Pathological Society. He was honored by various medical organizations, having served as President of the Hennepin County Medical Society in 1900-1901; the Minnesota State Medical Society in 1893; the Academy of Medicine in 1888-1889; the Minnesota Pathological Society in 1913-1914; and the Western Surgical Association in 1911. He was a member of the American Medical Association and of the American College of Surgeons.

Early in his professional career he became a contributor to medical literature out of the richness of his experience and his scientific observations. The first publication of which I find record was a paper upon "Antipyrin" published in the Northwestern Lancet in 1885. Then follows year by year a long bibliographic list of observations, case reports, public addresses, and medical society papers which will be published elsewhere. These titles cover a wide range of subjects. Some of these contributions to medical literature are especially noteworthy and were real additions to medical knowledge. Among these should be mentioned his paper read before the Western Surgical Association in December, 1915, upon "The Early Diagnosis of Intussusception in Children under Three Years of Age," which made a profound impression and is considered a classic in the clinical description of this condition. His last paper published in Minnesota Medicine in 1923 was entitled "Surgery in a Past Generation." This closes the chapter of his life achievements. It is a fine record.

The members of this Academy will miss this modest man with his honest, frank manner, his quiet dignity, his hatred of sham or deceit. In his death the profession of medicine has lost a truly great member.

The Committee:

Archa E. Wilcox,
Arthur T. Mann,
Geo. Douglas Head, Chairman.

The scientific program of the evening was as follows:

Dr. Emil S. Geist (Minneapolis) read a paper on "Fracture of the Hip." Numerous charts were shown.

DISCUSSION

Dr. A. T. Mann (Minneapolis): It seems to me that the supposition that the synovial fluid prevents union in these fractures is purely a theoretical assumption and is not proven. The examples which are given to support the contention that synovial fluid prevents union can be explained on some other ground, and that is—circulation.

When the upper head of the radius is split into fragments and separated from the shaft, these fragments are entirely without a blood supply. They then become autografts and for union must be firmly fixed to the living ends of the bone; otherwise they will degenerate. I have found that out in a series of experiments on dogs to determine the behavior of autografts in the knee-joint. I have taken out one condyle of the femur in each knee and held it in my hand and then replaced it; *i.e.*, it becomes a true autograft. These I fastened into place sometimes with furniture nails and sometimes with screws. Most of them were fastened firmly; a few were fastened less firmly to determine their behavior. Those firmly fastened always lived and united into place; when loosely fastened, union failed and the graft degenerated. For the same reason this would be true of the fracture of the upper head of the radius, with the fragments separated from their blood supply, and of the small bone in the wrist. Unless fairly firmly fixed into place, they follow the law of non-union and absorption.

We have fractures of the patella which are bathed with synovial fluid. The rule under the old method of treatment is that there is never bony union. With the new treatment of opening the joint and fastening the fragments firmly, there is practicaly always union.

I want to commend the use of the carpenter's mallet to produce firm impaction. The principle is the same: that when the part which has no circulation is firmly fixed, it should follow the law of autografts and unite. With the Whitman technic one does not always get

them into close position because of the small, jagged irregularities which tend to hold the greater portions of fragment surfaces away from each other. But, with the impaction with the carpenter's mallet as Cotton uses it (which is a big wooden mallet), and he gives it a swinging stroke and a through stroke until he feels something yield, the fragments are forced into broad contact. If they are now held firmly they should follow the law of autografts, or better, and become united.

Dr. J. F. Corbett (Minneapolis): Something occurred in a case I had a while ago which indicates that healing is not always a case of contact. The case I refer to is that of an old lady who had an impacted fracture of the femur. This had been treated for some months and the fragments were still in apposition when I first saw the case, but in the course of time, in spite of the fact that she kept off her feet, absorption of the bone occurred, there was non-union and a slipping of the fragments occurred. It seems that could not be from lack of contact because we had good contact. There is something else that enters in, either disturbance of circulation or synovial fluid as has been suggested.

Dr. A. R. Colvin (St. Paul): Dr. Geist has read a paper on a very important subject.

I think it is pretty generally conceded now that union is to be expected even in the sub-capital fractures of the neck, and that it is the rule, if the treatment advised by Whitman is faithfully carried out. I had one patient 85 years of age, whose sub-capital fracture united. At the Ancker Hospital, where we always have ten or twelve fractures of this character, we practically do not have non-union, if Whitman's procedure is carried out to the finish.

Intertrochanteric fractures always unite; the problem here is to get union in a good position.

Regarding synovial fluid, and non-union, the amount of synovial fluid in a normal joint is very small and the effusion in an injured joint is an inflammatory exudate. Dr. Mann's reference to the influence of synovial fluid in fracture of the patella is very convincing. There is a wide separation of fragments, but if they are brought into control by suture, union practically always occurs. Synovial fluid has a much better opportunity here to prevent union than in hip fractures, where perhaps there is always at least partial contact of fragments.

While stereoscopic radiographs of fractures of the neck of the femur are interesting as a study, they are not at all necessary. A plain radiograph gives us sufficient information for diagnosis and treatment. The deformity both clinically and pathologically is very typical; the posterior aspect of the neck, being its weakest part, gives way first and whether impaction occurs or not, the deformity is explained by the crushing of this area, the limb thus rolls outward causing the eversion of the foot, which is so typical. With this deformity present, we know that its correction means correction of the deformed position of the fragments, and this is accomplished by traction, inversion, and abduction of the limb.

It is well to remember that incomplete fractures of the neck of the femur occur, and that both here and in fractures without displacement the careful handling of the patient, while being transported to a hospital for instance, is very important. I have seen one case where, in a doubtful diagnosis, an *x*-ray showed a fracture without displacement, but when the patient arrived at the hospital in the ambulance both clinically and radiographically the picture had changed to the typical deformity. It is also well to remember that in impacted fractures of the neck the impaction may be of such firmness that the patient can walk for some time before the impacted area breaks down. This is important not only from a therapeutic point of view, but also from a medico-legal one.

I recall a recent case at the Ancker Hospital of sub-capital fracture in a young man with bilateral paralysis of the lower extremities due to poliomyelitis; some months after union had been obtained he fell and re-fractured the same hip. This time it seemed wisest to take out the head and insert the neck of the femur into the acetabulum. The head was soft and yellowish in color, and looked almost like a necrosed bone; it was quite evident that union again would be impossible.

It is also well to remember that, even where a perfect anatomical result is obtained, occasionally a deforming arthritis, with osteophytic outgrowths will occur, which is very disabling.

Dr. C. C. Chatterton (St. Paul): I remember my first visit to the American Orthopedic Society and at that meeting one of the older members stated that he never had non-union in intra-capsular fractures because he treated the cases until they were well. I have seen two patients this winter with very good treatment over too short a period of time; patients were up and about too soon and, if callus was formed, it had broken up. I think the Whitman method of treatment for intracapsulars is the best method and if adhered to, the time element being carefully considered with at least four months without weight-bearing, that union will practically always take place. Such men as Albee even state that there are only about ten per cent of intracapsular fractures of the hip in which bone grafts should be used. I am sure that if the Whitman method is used consciously, the result in intracapsular fractures will be most satisfactory.

Dr. George E. Fahr (Minneapolis) read a paper on "Myxedema Heart," illustrated with numerous lantern slides.

DISCUSSION

Dr. Carl Drake (St. Paul): I wish to ask Dr. Fahr whether some of the reduction in heart measurements can't be accounted for by loss of body weight, a lower diaphragm, and a swinging of the heart more towards the center of the chest? Also whether a dis-

appearance of the myxedema might not result in the diminution in the thickness of the heart muscle?

Dr. H. L. Ulrich (Minneapolis): There is no question that the heart muscle does not function as well in a certain percentage of myxedema. The far advanced cases of dilatation with cardiac insufficiency are quite obvious. It is the mild myxedema or subthyroids with functional changes mainly of conduction which are more frequent, less obvious, the more overlooked. To illustrate: Recently I saw a middle-aged woman, the wife of a competent physician. She had been having a great deal of trouble with attacks of auricular fibrillation. She has an organic defect—double mitral. Her basal rate was minus 25 per cent. Since using thyroid, fibrillation has not occurred. To me it is a little puzzling, physiologically speaking, how a heart which dilates several times can come back to its normal size. We have always considered that when a heart dilated and then returned to its apparent normal size, there would be some change in the size of the cells themselves with a little subsequent hypertrophy. Why this does not occur in the myxedema heart, I don't know.

Dr. Geo. Douglas Head (Minneapolis): I would like to raise the question of the amount of fluid actually lost by these patients while under the administration of thyroid as compared to the amount of fluid in the circulatory system when they were not taking thyroid. It does seem very remarkable that these hearts should change so tremendously in size in such a short time. I think we have all observed circulatory changes in myxedema: the lack of cardiac force, dyspnea on exertion, edema, etc., but I think Dr. Fahr has brought out something here that perhaps not many of us have appreciated. I know I haven't, and I shall certainly be on the lookout for it in the future. The cause of this very remarkable dilatation of the heart chambers might possibly be explained on the basis of retention of fluid in the vascular system when thyroid is not being given as compared with that when it is given.

Dr. G. Schwyzer (Minneapolis): I would like to ask Dr. Fahr about the weight of the patient; having seen a number of myxedematous cases with and without thyroidectomy, I am especially interested in Dr. Fahr's valuable observation. I have never noticed any heart symptoms that were alarming in any of my cases of myxedema. I wonder whether this myxedema heart, as Dr. Fahr calls it, is a rarity or whether we did not make a sufficient study of the heart in our cases.

I recall especially a case in a woman who never was operated upon for her goiter and who was a pronounced case of myxedema. She complained of marked weakness in her legs, had difficulty in her speech, her mental attitude was entirely changed, and she had gained twenty pounds in weight due to the marked deposits of mucin in her subcutaneous tissue. These twenty pounds body weight disappeared magically by administering thyroid extract in sufficient quantity.

I am wondering whether the mucin deposit in the body might account for the change in the heart.

Dr. F. E. Burch (St. Paul): I wish to ask Dr. Fahr if he has any observations on changes in the hearts of myxedematous children.

Dr. Fahr (in closing): Two gentlemen brought up the question of loss of weight. It is true there was loss of weight; that always takes place when you have myxedematous patients and put them on thyroid. The weight changes, as well as changes in the anemia which they practically all have, are much slower than the heart change. The weight loss still keeps on after the heart has become compensated.

In connection with what Dr. Drake brought up about the diaphragm position, I used the transverse diameter measurements in this talk, but I have also measured the silhouette area which does not change much with slight change of diaphragm position. Moreover, the diaphragm is actually in nearly the same position before and after giving thyroid. So the change is not due to change in the position of the diaphragm.

About the thickness of the muscle and about the mucin deposit in the heart, Dr. Bell has looked at one of the cretin sheep hearts and he says there is no pathologic change in the heart muscle that he has discovered so far. Thickness of the muscle can't be the thing that causes these changes for a change in thickness would be of the order of a few millimeters only.

Dr. Head asked about the fluid lost and how much increase of fluid there might be in the circulation. One of the things that the thyroid does is to mobilize water in the tissues. When you give thyroid you can prove that water has been pulled out of the tissues and put back into the blood which, in myxedema, has less than in the normal state. That is one reason why you get diuresis on thyroid administration.

Dr. Ulrich brought out that there might be mild borderland types of myxedema. I did not go into them tonight because they are very hard to prove. I believe, as Dr. Ulrich does, that there are many people walking around whose memory is bad, thinking a little more slowly than formerly, and when you take their basal rate it will be only minus .10 or minus .12 or minus .15, and who are frequently a little short of breath. Putting them on thyroid my help them. I notice Dr. Ulrich was keen enough to give thyroid in a case of old mitral stenosis with recent symptoms of mild myxedema. At the same time that you give the heart more work to do you are giving it more ability to do it in myxedema treated with thyroid extract. I think on the whole you are justified in giving a dose of thyroid even if there is some heart disease present, provided you watch the case carefully for a long period.

Dr. Gustav Schwyzer stated that these alarming cases are very rare in his practice and he sees quite a lot of myxedema. I do not claim that all cases of myxedema are heart cases. In three years we have had six cases of myxedema and in all six cases there were some symptoms of heart failure. If I should make the statement that all cases have it, that would not be true. Heart disease is sometimes associated with

myxedema. At the present time no one knows how frequently.

Dr. Burch asked about myxedema in children. I have no material to study that phase of it and have not studied that at all.

Dr. A. R. Colvin (St. Paul) reported a case of acute duodenitis, with operative and postmortem findings:

The patient was an unmarried woman, age 66, who entered Ancker Hospital March 28, 1927, complaining of abdominal pain, nausea and vomiting. She said she had been suffering from a cold off and on all winter, and that she was quite suddenly taken ill 48 hours before admission, with pain and nausea at 9 p. m. At 2 a. m. of the next day, she was unable to retain anything taken by mouth. The pain was of a sharp cutting character. For the past 15 years she says she has been bothered with gas on her stomach, and belching. She found that certain rich and greasy foods disagreed with her.

Except for childhood diseases, she had always been remarkably well.

When seen by me the next morning, after her admission, she presented the appearance of a very sick person; her pulse was frequent and irregular, temperature 100½°, leukocyte count 29,000. The urine contained a heavy trace of albumin and some pus cells. One got the impression that while her sensibilities seemed blunted, she evidently was suffering a good deal, but was quite careless in the recital of her symptoms.

There was general abdominal tenderness with more complaint of pressure in the right hypochondrium than elsewhere; muscular resistance, while more evident in this region, was not anywhere very marked. There was nothing abnormal made out by pelvic examination.

While realizing the gravity of her illness, in the analysis of history, symptoms, and physical findings, difficulty was experienced in arriving at the apparent beginning of her pathology. A ruptured appendix seemed improbable; there was nothing in the pelvis to cause the symptom complex, neither the history of onset nor the course afterwards was like that of perforation of gastric or duodenal ulcer, and the symptoms and physical findings were not like those usually seen from a neglected perforation. Acute pancreatitis seemed just as unlikely; and while an acute phlegmonous or gangrenous inflammation of the gallbladder can run a rapidly destructive course, still there seemed to be something contradictory in the story and findings. One noted the albumin and pus in the catheterized specimen of urine, without feeling that these findings had anything to do with the symptoms. And so such was the frame of mind in which one approached the operation.

A midline incision above the umbilicus disclosed an acute inflammatory condition in the region bounded by the duodenum, colon and right kidney. The duodenum was thickened, red, edematous, and both it and the surrounding tissues were covered with a fibrinous exudate; while there was in this region no thick pus, there was a small amount of cloudy fluid. Not finding any perforation of either stomach or duodenum, and the gallbladder looking more or less normal, a hurried examination of the region of the appendix was made and, nothing being found, the operative wound was closed with drainage. The patient died 8 hours later.

Postmortem findings: There is a small amount of free purulent fluid in the peritoneal cavity. The gallbladder wall is somewhat thickened and its surface is covered with yellow fibrin similar to that seen in the rest of the peritoneal cavity. There is an opacity of the surface which is apparently not associated with the acute process. The mucosa is flecked with small areas of cholesterin, and the bile ducts are patent.

The stomach shows nothing of note. The first 2 cm. of the duodenum are practically normal. Beginning about in the region of the ampulla of Vater the duodenal wall is markedly thickened. This thickening involves the duodenum from this point to the beginning of the jejunum at the ligament of Treitz. Besides this thickening of the duodenal wall, there is a multiple ulcerative process of the mucosa. These ulcers are acute in appearance, irregular in outline, but for the most part are transverse in location. They have a purulent material on their bases, but there is no evidence that they perforate deeper than the submucosa. The balance of the intestinal tract shows nothing of note.

The right kidney weighs 163 grams. The capsule strips with some difficulty, tearing the cortical surface of the organ. The cut surface of the organ is cloudy and swollen in appearance and the markings are indistinct. The cut edge everts. The pelvis is slightly dilated and the ureter is indurated, but about normal in size. The left kidney weighs 105 grams. The pelvis is enormously dilated so that the organ is practically destroyed. In one calyx is lodged a stone. This stone, however, is not located at the pelvic ureteral junction. The dilatation has practically destroyed the entire kidney so that it is simply a sac and contains a purulent fluid.

Diagnoses:

1. Acute fibrinous peritonitis.
2. Acute ulcerative duodenitis.
3. Chronic pyonephrosis (left).
4. Renal calculus.
5. Bilateral bronchopneumonia.
6. Chronic cholecystitis.
7. Cloudy swelling of the heart, liver and kidneys.

DISCUSSION

Dr. A. Schwyzer (St. Paul): This is an unusually pretty case, but I don't think it quite belongs in the same group as the cases of duodenitis which Dr. Judd reports. His cases were more of long standing and gave symptoms very similar to ulcers; they were localized infiltrations situated where most of the duodenal ulcers are found. They give a history of prolonged distress and are amenable to surgical relief.

The case which Dr. Colvin shows us here represents what we know from pathology as multiple duodenal ulcers, not very infrequently seen in grave septic infections. It may be that the kidney infection in this

case was the primary cause for this. This is an acute infectious process, as part of a general sepsis.

A few weeks ago I excised one of the localized infiltrations in the duodenum, such as Judd reports. It was situated near the pylorus. The symptoms were of a more chronic character, similar to ulcer. The area was removed, together with the anterior part of the pyloric sphincter, and the opening closed transversely. While there was muck thickening, it was mostly all in the sub-mucosa. The mucosa was not ulcerated. This patient also had an infected gallbladder. There were no stones, but from the wall of the gallbladder we cultured staphylococcus aureus.

Dr. H. L. Ulrich (Minneapolis): Dr. Colvin's report reminds me that every once in a while a chronic infection of the genito-urinary tract is not such a mild affair. I saw a young man recently who had a chronic cystitis with a diverticulum of the bladder and pyelitis of the right side. He was cystoscoped. He had an acute reaction following this and on the third day after the reaction was receding he complained of a sudden intense pain in the head and became unconscious. There were no localizing symptoms. Lumbar puncture gave us a bloody fluid followed by pure blood. He died in seven hours. Autopsy revealed a subdural hemorrhage which was universal. One cannot help feeling that his chronic infection paved the way for this hemorrhagic manifestation.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

RESIGNATION OF DR. GEORGE H. SIMMONS

The Council on Pharmacy and Chemistry has accepted with regret the resignation of Dr. George H. Simmons from the chairmanship of the Council. Since 1905 Dr. Simmons has guided the activities of the Council. Before the establishment of the Council, the standard and quality of drugs were left entirely to the manufacturer, except for products in the Pharmacopeia. The rise of the proprietary medicine industry and the numerous attempts made to foist on the public and on the medical profession products without merit led to repeated calls from the House of Delegates of the American Medical Association for an official body to aid in overcoming this evil. As General Manager, in February, 1905, Dr. Simmons first presented to the Board of Trustees of the American Medical Association a plan for the organization of such a body, and, in accordance with their decision, arranged for the first meeting, February 11, 1905. Under his guidance the Council has carried forward its work and today still stands as the only medium to which the physician may turn for the unbiased truth regarding proprietary medicines. In accepting his resignation, the Council extended him a vote of thanks, not only on its own behalf but also on behalf of all the medical profession of this country. (Jour. A. M. A., May 7, 1927, p. 1483.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of March 3, 1927.

Meeting was called to order by Dr. S. R. Maxeiner, Vice President.

Dr. Verne S. Cabot read a paper on Surgery in Gastric Ulcer which is published on page 412 of this issue of Minnesota Medicine. Published discussions will be found following the paper itself in this issue.

A paper was also read by Dr. H. O. McPheeters entitled "Injection Treatment of Varicose Veins by the Use of Sclerosing Solutions," the abstract of which follows:

Abstract of Paper On

THE INJECTION TREATMENT OF VARICOSE VEINS BY THE USE OF SCLEROSIS SOLUTIONS*

H. O. McPheeters, M.D., F.A.C.S.

The injection treatment of varicose veins by the use of sclerosing solutions has been practised in the European Clinics extensively for the past fifteen years with most gratifying results. The principle of the treatment has been the production of a chemically produced thrombo-phlebitis by a destruction of the intima of the vein. This causes a firm thrombus formation densely adhered to the vessel wall, in contradistinction to the thrombus that is formed following the usual infectious thrombo-phlebitis which causes an adhering of the thrombus at separate sites on the vessel wall, leaving the majority of the clot lying against the normal intact endothelium and thus free to break loose and form an embolus at any time following manipulation of the hard thrombosed vein in any way. This is the reason that emboli happen so frequently following surgery. Theoretically, the embolus should occur frequently following the injection treatment but, practically, it never occurs.

Many types of solutions are used, but this report is confined entirely to the use of 20 per cent sodium chloride in sterile distilled water. The report deals with a total of 31 cases with approximately 180 separate injections. At no time have the patients had any untoward symptoms except those following faculty technic. The only objection to the method is the occurrence of a cramp-like pain in the extremity distal to the site of injection, which lasts about one-half to one minute following the injection. The treatment is entirely ambulatory. In fact, the author believes that he gets better results if the patient is ambulatory than if he is at rest.

Dr. J. M. Hayes: I want to congratulate Dr. McPheeters on his excellent presentation of this work.

The first of this work done extensively in America was by Dr. Kretchmeier, who came to this country about six or seven years ago and located at Red Wing, Minnesota. After remaining there about a year he

*This paper will appear in full in Surgery, Gynecology and Obstetrics.

came to Minneapolis and located here. He created quite a sensation here among the victims of varicose veins and ulcers.

In the outpatient department of the University of Minnesota, we had many requests for these treatments.

I went to consult Dr. Kretchmeier and to get his opinion of what he might do. I had hoped that he might treat some of these charity cases or teach us how to do it. I got little useful information. I looked up the German literature and found that Linser had first done this work in 1911. He first wrote it up in 1917. At first he used only a solution of bichloride of mercury 1 c.c. of a 1 per cent solution at a sitting. This amount of bichloride of mercury is not a toxic dose. Hammar, who reported the only fatal case in literature, made several injections at a sitting and evidently administered a lethal dose. It has been shown that this amount of bichloride is eliminated in twenty-four hours. We, therefore, may inject every twenty-four hours. In the dispensary and in my office I have injected about 150 patients and have done over 1,500 injections in all. I had three or four perivenous injections the first year I used this method but not one recently. The first year I always injected sterile water first so that I could make sure that I was in the vein before injecting the bichloride. We tried salt solution and also sodium salicylate to replace the mercury but were not able to obtain as good results. These other materials were more inconvenient to inject and we did not get thrombosis so frequently or consistently. Our technic of injecting is not the same as Linser's. I insert the needle in the full vein, then merely collapse the vein on the point of the needle as the solution is being injected. After the needle is withdrawn the venous collapse is maintained by fastening a small pad of cotton or gauze over this point. The slides will show the type of cases in which we used this method, most widely. You may readily see that these cases were not favorable for surgery, nor, in fact, for any other curative method.

Dr. Moses Barron: There are several points I would like to speak about, especially in regard to the thrombosis which is produced by injection of certain solutions into the veins. Spontaneous thrombi and more especially the so-called marantic thrombi, form in veins that may be not greatly diseased and consequently may possess fairly normal endothelial lining. Such thrombi can, therefore, break loose at times and produce pulmonary emboli. The thrombosis on the other hand which develops in a vein that has been injected is of quite a different nature. The injected material acts as an irritant on the lining and causes a swelling and degeneration of the intima. It is on this degenerated surface that the thrombus gradually develops by a deposition of fibrin and blood platelets. The thrombus formation goes on slowly and the clot becomes firmly adherent to the wall of the vein, thus favoring early organization. Obviously such a thrombus can be dislodged only with great difficulty or not at all.

Dr. Bessessen brought out a point in regard to the importance of expressing the blood from the vein before injecting in order to secure coaptation of the two wall surfaces and thus bring about organization. The reason for expressing blood from the veins is not to bring the two walls together, but to keep the injected material from being so greatly diluted with blood as to interfere with its destructive action upon the endothelial cells. The injection method of treatment of varicose veins is extensively used in Europe. Instead of mercuric chloride or concentrated salt solution they now use an invert sugar called calorose. Formerly they also used a 66 per cent sugar solution but this solution was too thick and syrupy. The calorose solution is thin and can pass through a fine needle. A fine needle, however, is not necessary for such a purpose. Ten c.c. of this invert sugar solution is injected into a varicose vein after pressure is applied above with the thumb and the area is then bandaged with a little pressure. A coarser needle is of value, in that one is able to tell more readily when you have entered the vein before starting to inject the solution. The injection of more than one vein at a single sitting is generally advised against, because of the possible danger of thrombi that may break loose. As to the question of the reverse flow of blood in these veins, it has been definitely proven that this does occur. This condition, however, is favorable for the injection treatment rather than against it, since it also helps to obviate the danger of loosening emboli and carrying them to the lungs.

Dr. L. C. Logefeil: I think that Dr. McPheeters is to be complimented on the fact that he brought this matter before the medical profession in such an interesting manner.

I was fortunate enough to see some of this work done on my recent trip abroad. Linser in Berlin and Linser in Dresden are perhaps doing most of this work. It was being done extensively in Paris. I liked best the way the injections were given in Vienna. They were taken care of in the Department of Dermatology and the solution used was calorose, which is a 40 per cent invertin sugar solution. The advantages claimed for this solution were the following: (1) that it produced less pain; (2) was less likely to give a slough if some of it was injected outside of the vein; (3) that it was entirely non-toxic, which allowed larger amounts to be given.

I have been using this solution since my return, as well as the salt solution which Dr. McPheeters uses, but my experience bears out what I saw in Vienna. Salt solution seemed to give a very severe cramp in all of my cases, while the calorose gave only a very slight cramp or none. On one occasion I injected about 5 c.c. and later found that it was outside of the vein but got no sloughs, only a hard painful indurated area which disappeared after a few days.

The technic used in Vienna is somewhat different than what Dr. McPheeters describes. The leg is kept in the prone position and the blood is milked out of the vein before the calarose is injected, thus avoiding

dilution of the sclerosing solution. The contra-indications stated by them were pregnancy, and valve stones, with no injection of large veins above the lower third of the thigh. The process is a simple one and the patients are ambulatory throughout. Professor Noble reported 3,700 cases with 10,000 injections with only two cases that showed slight evidence of emboli, but these cleared up without any serious trouble. They never injected more than one vein at a sitting and never more than twice a week.

My impression of this method of treatment of varicose veins is that it is safe and reliable if the proper precautions are taken, and the usual rules laid down, which are found to be necessary by men who have had extensive experience.

At the executive meeting following the scientific discussions the following officers were elected for the coming year: Dr. H. B. Sweetser, president; Dr. W. D. White, vice president; Dr. T. H. Sweetser, secretary and treasurer.

THEODORE H. SWEETSER, M.D., Secretary.

THE DOCTORS OUGHT TO KNOW

An official tells of a country laborer who, on his way to work one morning, called at the office of vital statistics and made known his wish to register his wife's death.

When the clerk asked the date of the demise the man said:

"She ain't dead yet, but she will be before night. I thought it would save me another journey if you put it down now."

"That won't do at all," said the clerk. "Perhaps your wife will live a long while yet."

"Well, I don't know," responded the laborer, doubtfully. "The doctor says she won't and he knows what he has given her."—Pittsburgh *Chronicle-Telegraph*.

MOTHER REFUSES TO LET CHILDREN TAKE SCHICK TEST; OPPOSES "SHEIKS"

(By Associated Press)

Harrison, N. J., Feb. 15.—The board of health wrote parents asking for consent for children to undergo the Schick test. A perturbed mother of two boys replied: "I refuse positively. I have read the book and seen the play and I don't approve of them."

A pamphlet about diphtheria has been sent her.—*St. Paul Dispatch*, Feb. 15, 1927.

COMPETITION

"Yes," said the specialist, as he stood at the bedside of the sick purchasing agent, "I can cure you."

"What will it cost?" asked the sick man, faintly.

"Five hundred dollars."

"You'll have to shade your price a little," replied the purchasing agent; "I had a better bid from the undertaker."

CASE REPORTS

Members are requested to report interesting and unusual cases for publication in this department. Many cases reported at hospital staff meetings and similar meetings are very instructive and worthy of publication.

STRANGULATED HERNIA THROUGH THE FORAMEN OF WINSLOW

REPORT OF CASE

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Minneapolis

The following is a report of a patient referred to me by Dr. C. G. Salt, my associate, for operation, together with a brief survey of the literature and a few points concerning the etiology, diagnosis, prognosis and treatment.

A. W., male laborer, aged 42, Scandinavian, was tall, rawboned and apparently in good health.

Family history.—Negative.

Previous history.—He had enjoyed good health with the exception of occasional gastric disturbances which at times suggested a possible peptic ulcer. Nothing similar to the present illness, however, had been experienced.

Chief complaint.—Pain in the upper abdomen, vomiting and constipation.

Present illness.—On Wednesday evening, January 20, 1926, following a fairly heavy meal, the patient states that he was seized with sudden severe abdominal pain followed in fifteen or twenty minutes with vomiting and retching. Later in the evening a physician in the neighborhood was called who diagnosed gallstone colic and gave him a hypodermic which relieved him for the night. During the next two days he had occasional paroxysms of cramps and vomiting but needed no medical attention until January 23rd, when Dr. Salt saw him and sent him to the hospital.

Physical examination.—The general appearance of the patient was fairly good considering the length of time he had been sick and unable to eat. He was quiet except during paroxysms of pain and retching when he would raise a cupful or less of dark, foul-smelling fluid. His color was poor and his face had an anxious expression. He was considerably desiccated though his skin was quite moist. His abdomen was not particularly distended except in the epigastrium. He complained of pain in the left side of the neck and lay on his left side, doubled up as much as possible, and complained bitterly at any effort to turn on his back or the other side. His temperature was 98, pulse 80 and respiration 20. His pulse was not of a very good quality. Leucocyte count was 7,500. Urine, Sp. Gr. 1.026, contained a slight amount of albumin, a few casts and no sugar.

An enema was given with very good results.

After two hours observation decision to operate was made on the following points:

1. The man had been in good health until the onset of symptoms Wednesday evening, except for stomach trouble.

2. No other member of the family had been taken sick following the same meal.

3. Continued paroxysmal vomiting had been present from the onset.

4. Pain and cramps in the abdomen were somewhat spasmodic although not very severe.

5. Fullness, tumefaction and tenderness were present in the epigastrium.

6. The pulse was becoming distinctly more rapid.

At operation a mid-line incision was made from the xiphoid cartilage to a point 4 or 5 centimeters below the umbilicus. Much bloody fluid escaped and dark intestines presented at once. Investigation showed that about three feet of the lower jejunum had passed through the foramen of Winslow and out through a defect in the gastro-hepatic omentum so that the completely obstructed portion of the gut laid out over the lesser curvature of the stomach. With a small hook retractor we were able to lift up the anterior border of the foramen and stretch the ring so that with considerable difficulty we were able to reduce the distended portion of the gut. The dark mahogany color of the bowel began to improve as soon as it was released, but because of the length of time which had elapsed since the beginning of his illness we did an enterotomy and quickly and easily emptied the damaged gut well back to the duodenum. The abdomen was closed with drainage. The patient suffered much greater shock than is usual for a similar amount of strangulation. He took large quantities of hypodermoclysis but in spite of all we could do with stimulants or otherwise he grew steadily weaker and died about thirty-six hours later. Privilege of necropsy was denied.

In the survey of the literature I find that Dr. Alfred Ullman of Baltimore in February, 1924, published an article in *Surgery, Gynecology and Obstetrics* in which he reported a case of his own and gave a very complete report of twenty-nine other cases prior to that date. Since then five others, including my own, have been reported. Dr. Exel Westman of Sweden, Dr. M. E. Foster of Fort Smith, Arkansas, Dr. J. E. Engstadt of Fargo, N. D., and Dr. J. B. Deaver of Philadelphia, have each reported a case.

In going over these cases, there are several points of interest which I think ought to be noted.

Blandin in 1824 reported the first case which was found at autopsy and from that time until 1888, seven cases were reported by various authors, all found at autopsy. In 1888 F. Treves of London reported the first case operated and since then all but three cases reported have been operated. Of the twenty-four cases operated, ten have recovered and fourteen have died. No case has been diagnosed preoperatively. The length of time from the onset of symptoms until operation is also quite significant. In those cases that recovered, it ranged from a half to twenty-eight days with an average in all cases of nine days, and with those that died from a half day to twenty-one days with an average of five days. From this one would be led to believe that the strangulation was of a slow development.

The amount of gut found strangulated is extremely variable, from a small knuckle to nearly the entire large and small bowel combined. The reports seem to show that the cases with the better prognosis have been those where the bowel strangulated was farthest from the stomach. Age is unimportant as the cases seem to be equally distributed between five and seventy-five years. No case has been reported as congenital. There were about four times as many cases in men as in women.

Etiology.—The location of the foramen of Winslow in the upper abdomen undoubtedly has a great deal to do with the rare occurrence of a hernia into the lesser peritoneal sac, as the opening is constant normally in all individuals. Piersol, the anatomist, gives the only anatomatical reason I could find and that is a long mesentery of the gut. As an exciting factor the report shows that straining and violent exercise, often following ingestion of a full meal, are the most important.

Diagnosis.—Though the diagnosis has never been made preoperatively, I would say the extreme rareness of the condition is the greatest reason. The condition is most readily confused with acute gastritis, acute inflammation of the gallbladder, or pancreatitis. However, with the slow development which is so frequently reported, the use of the *x*-ray and more careful observation and clinical study should make it possible to make a preoperative diagnosis.

Prognosis.—As in other forms of strangulation, early diagnosis and early operation are of the greatest importance. Strangulation in the jejunum or upper lobe is not well borne and in only one of the cases reported that recovered was any considerable length of the jejunum involved. Trauma to important structures surrounding the foramen of Winslow during operation should also be considered in making a prognosis in any given case.

Treatment.—The technical part of the operation in one of these cases is particularly hazardous because of the important structures contained in the constricting ring. Ofttimes the operator has been able to stretch the ring sufficiently to withdraw the gut, but if this cannot be done without too much trauma the lesser peritoneal sac should be entered either through the gastrohepatic omentum or below the stomach in whatever place offers the easiest access and the gut should be emptied or dealt with in whatever way is necessary.

CONCLUSIONS

1. Strangulated hernia through the foramen of Winslow is an exceedingly rare condition.

2. The condition is most frequently found in men and usually comes on after a severe strain or lifting or following the ingestion of a full meal.

3. It would seem that preoperative diagnosis should be made more easily than in other internal strangulated hernias.

4. The prognosis is grave but varies with the extent of the strangulation and its location in the intestinal tract.

5. Operation in the region becomes exteremely technical and difficult because of the structures bounding the foramen.

6. These cases are extrahazardous and all methods known to modern surgery should be employed to tide the patient past the critical stage.

TORSION OF HYDROSALPINX

REPORT OF CASE

LEE MONROE MILES, S.B., M.D., F.A.C.S.
St. Paul

Torsion of hydrosalpinx is not an exceedingly rare gynecological finding, yet its occurrence is sufficiently rare to warrant the presentation of a case and a discussion of the diagnostic points. Hydrosalpinx is one of the end-results of an acute salpingitis, but for the dilated tube to become twisted on its pedicle two conditions must obtain that account for the rarity of the condition: the hydrosalpinx must be free from peritoneal adhesions and it must be provided with an unusually free mesosalpinx. As a consequence of peritoneal inflammation a tube which has been the site of an acute salpingitis is usually so firmly bound to the surrounding structures by strong adhesions as to effectively preclude the occurrence of complication by torsion. The fact that a twisted hydrosalpinx is found at operation points to a very mild degree of salpingitis with less than the usual amount of pelvic peritoneal inflammation. The mesosalpinx is usually too short to admit of torsion. Though twisting of a normal tube has been reported, it is one of the rarest of all gynecological conditions.

This case is presented because of the very interesting problem it offered in differential diagnosis.

Case history.—Mrs. A. W., a married woman, aged 25, was first seen at home on May 16, 1927, at ten-thirty in the evening. She was suffering with extreme pain in the lower abdomen. The onset of the present attack of pain had occurred at about five o'clock in the afternoon of the same day. She had been feeling very well and was down town shopping when she was seized with a sudden, very severe pain in the lower abdomen, more marked on the right side. She did not faint but was unable to take the street car and had to call a cab to reach home. She went to bed and applied heat to the abdomen without relief. The pain was not paroxysmal in character but was constant and very severe.

Her general health had always been unusually good, she was always strong and active. She had given birth to a full term child that is now nine years of age. No other pregnancies had occurred. Menstruation was always normal and regular with moderate flow of the 28 day interval type lasting four days. The last regular period was on April 5, 1927. A period should have occurred on the third day of May, but was thirteen days overdue. Shortly after the attack of pain began she noticed that she was having vaginal bleeding rather more profusely than at her regular periods but still not an excessive hemorrhage. There was no history of any previous attack of pelvic pain to suggest a preceding attack of salpingitis. The puerperal period at the birth of her child was not complicated though she stated that she was up and about her work after the second day. The only history suggestive of any pelvic disorder was that her periods, which had formerly been painless, became painful after delivery.

Physical examination revealed a strong, robust patient very evidently suffering with excruciating pain. Her temperature was 98.6° and her pulse rate was 85 per minute. The abdomen was moderately distended in the lower portion and on palpation no masses could be made out though there was exquisite tenderness on pressure over the entire lower abdomen but more marked on the right side just lateral to the mid-line and above Poupart's ligament. Examination of the pelvis revealed a bloody discharge from the vagina, the cervix was lacerated, softening of the cervix was questionable and the external os was closed. The uterus was not palpably enlarged and was in second degree of retroversion. On the right side of the uterus there was a mass which was soft in consistency and very painful on pressure. Because of the extreme pain caused by pressure it was impossible to outline the uterus or the mass accurately, the slightest movement of the uterus or pressure in the right fornix causing pain and muscle spasm.

Differential diagnosis. Acute appendicitis could be ruled out on the suddenness of the attack, the character of the pain, the normal temperature and on the physical findings which pointed definitely to a pelvic condition. Acute salpingitis causes a marked rise of temperature, does not begin with the suddenness which marked this condition and does not cause such severe pain nor the extreme tenderness on palpation. The history of having gone thirteen days beyond her normal menstrual time is strongly suggestive of a pregnancy. Abortion was considered but the character of the pain, continuous and not paroxysmal, and the closed external os and the degree of pelvic pain are all against that diagnosis. This history and physical findings are perfectly typical of a case of ruptured ectopic pregnancy; the delayed menstruation, the sudden attack of pain in the lower abdomen, the onset of vaginal bleeding following the attack of pain, the tenderness in the lower abdomen and pelvic organs, the mass to the side of the uterus, the distension of the lower bowels pointing to peritoneal irritation, the very fact that she had gone a number of years without a pregnancy shows at least a relative sterility which is a point in favor of possible interference with descent of the ovum. Only one other condition could give the same clinical picture—torsion of either a tube or ovary. In favor of torsion of a

tube is the fact that a sterility of nine years duration points not to a relative sterility but to absolute sterility with occlusion of the tubes. Against this diagnosis is the absence in the history of any indication of a preceding salpingitis. Again, the delay in the onset of her menstruation and the appearance of bleeding after the onset of pain are certainly much more in favor of an ectopic pregnancy than torsion of a tube. Torsion of an ovary is very rare unless there is a cyst present of some size and in this case the mass felt per vagina did not have the consistency of an ovarian cyst and was smaller than one would suspect being an ovarian cyst with torsion, because an ovarian cyst must reach considerable size before the pedicle is elongated sufficiently to become twisted.

A tentative diagnosis was made of a ruptured ectopic pregnancy with the rather remote possibility of torsion of a hydrosalpinx. Immediate operation was decided upon and the patient was taken to Bethesda Hospital and was prepared for operation. The abdomen was opened by the usual mid-line subumbilical incision. On opening the peritoneum the sigmoid and descending colon were found to be moderately distended. No free blood was found. The cecum and appendix were normal. On exploring the pelvic organs the left tube and ovary were found to be bound to the rectum and uterus by dense adhesions; on the right side the distal one-third of the tube was enlarged and distended and free from adhesions. As this portion of the tube was brought up into sight it was at once noticed that it was almost black in color, and the mass, which was 4.5 cm. in length by 2.5 cm. in diameter, was almost rectangular in shape and was composed of numerous loculi filled with dark fluid. As it was exposed in the hand it uncoiled spontaneously revolving from right to left one complete turn. It was a follicular hydrosalpinx that had become twisted one complete turn on itself from left to right. The dark color was due to interference with circulation and to the extravasation of blood into the loculi. This portion of the tube projected beyond the infundibulo-pelvic ligament and had a very long mesosalpinx. The right ovary was enlarged, cystic and buried in dense adhesions. The operation was completed by removing the right tube and ovary, the left tube, and closing the abdomen in the usual manner. Convalesence was uncomplicated.

Pathological diagnosis of the specimen was chronic salpingitis of left tube, chronic salpingitis with hematohydrosalpinx of the right tube and corpus luteum cyst of the right ovary.

Discussion of the case. Torsion of an hydrosalpinx has rarely been diagnosed prior to operation, most cases having been discovered, as was this one, at operation for a supposed ruptured ectopic gestation. The history of the attack, the character of the pain and the physical findings are remarkably similar in both conditions. In ectopic gestation there is usually the history, as in this case, of delay in the onset of a menstrual period and of bleeding after the onset of pain, but in a fairly large proportion of ectopic pregnancies the tubal rupture or tubal abortion occur at or so near the regular menstrual date that this point is not of the greatest importance. I believe that for an absolute and final preoperative diagnosis of torsion of a hydrosalpinx to be made one would need to have direct evidence of a pre-existing hydrosalpinx or evidence from the history of previous attack of salpingitis and the assurance that a pregnancy could not have occurred corresponding with the possible duration of the disease. In this case there was no evidence of previous pelvic inflammation and the patient could not give me any assurance that pregnancy could not have taken place; in fact she had supposed herself to be pregnant. No explanation can be offered for the delay in the appearance unless the presence of extensive hemorrhage into the corpus luteum of the right ovary would account for it. I have frequently noticed that patients who have this condition are irregular in their menstrual habits.

Although the pre-diagnosis of these cases is difficult the all-important consideration is to recognize the urgency of immediate operation both to relieve the suffering of the patient and to guard against distastrous complications.

215 Hamm Building.

ACUTE INFECTIVE MYELITIS

REPORT OF CASE

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Duluth, Minnesota

This is a case of acute transvere myelitis of infectious origin. The disease is relatively rare, no other cases having been recorded in St. Luke's hospital during the last four years. I will briefly review the history, findings and progress. An attempt will be made to explain these on the basis of the pathology.

R. J., white, a male student, aged 14; was first examined by me on April 13, 1924.

Present Complaint.—He complained of: (1) numbness in the feet; (2) tingling and pain in the lower extremities; (3) constipation; (4) fever.

Present Illness.—Numbness in the right foot, extending upward to the knee, began three days previous. He attended a movie in the afternoon, and was able to walk to and from the show. On the way home he developed some loss of power in the right leg. He became quite exhausted and went to bed in the afternoon.

The following morning about sixteen hours after the onset, both legs were equally involved. He was assisted into a chair and on attempting to stand, collapsed. He developed sensations of numbness and tingling at times and also stated that movements of the limbs became progressively more limited. Numbness became complete. Coupled with this, urinary dribbling was noted three days after the onset.

Past History.—His general health had always been good. In infancy he had been normal. Measles, chicken pox, sore throat, several years ago. Tonsillec-

tomy, 1918. The patient had a mild attack of *scarlet fever* two months previous (Feb. 1924). Recovery seemed uneventful. He tired easily following this illness.

He was *vaccinated* for small-pox (two weeks before). A marked reaction resulted. The arm swelled up to the shoulder and to half way between the elbow and wrist. He was bedridden for several days. The wound is now not quite healed. There was no history of previous injury.

Physical Examination.—The patient is a moderately developed male, lying quietly in bed. Pulse, 84, temperature 101.8, respiration 22.

Head and Neck: Scalp negative; eyes normal, pupils equal and react normally; ears and nose negative; tonsils out; pharynx normal; tongue heavily coated; neck not rigid.

Thorax: Symmetrical and fairly well developed.

Heart: Borders and tones normal; no thrill; no murmur; regular rate.

Lungs: Normal excursion; normal fremitus. Resonance not impaired. No râles.

Abdomen: Somewhat distended with hypogastric protrusion and tenderness. Swelling disappears upon catheterization. Sensory disturbance just below umbilicus.

Extremities: Upper, normal, except for vaccination wound, nickel sized, dirty and with indurated borders. Lower, normally developed, but with cutaneous anesthesia and flaccid motor paralysis.

Spinal Column: No abnormality noted.

Neurological Examination: Briefly illustrated in the accompanying chart.

Figure 1 will demonstrate the areas involved, with their cutaneous segmental arrangement according to Dana (Nervous Diseases, 1915, pp. 53-54).

Laboratory Findings.—

Urine: Negative except for trace of albumin developing after catheterization due to pus.

Spinal puncture: Not performed; deemed inadvisable.

Blood: Hemoglobin normal; w.b.c. 10,600 on entrance.

Complication.—After leaving the hospital he was kept in bed one month. At the end of this period he began passing calculi. At first they were small and soft, later larger and more firm. This was accompanied by dysuria and hematuria. Six months later with continuance of symptoms and without passing any more stones, removal of the two remaining stones (Fig. 2) was deemed necessary. These were found to be mainly calcium carbonate on chemical analysis. The operation consisted of a simple supra-

CHART I

Symptom	Initial	3 days later and lasting 4 days	3 weeks later	6 weeks later	2 years later
Paresis	+	0	+	Dim. +	0
Paraplegia	0	+	0	0	0
Numbness	+	0	+	0	0
Anesthesia	0	+	0	0	0
Cutaneous Reflexes:					
1. Abdominal	Dim.	0	Dim.	+	+
2. Cremasteric	Dim.	0	Dim.	+	+
3. Tickle-Stroke and Col.	Dim.	0	Dim.	+	+
Tendon Reflexes					
1. Patellar	Dim.	0	Dim.	Normal	Increased ?
2. Achilles	Dim.	0	Dim.	Normal	Increased
3. Ankle Clonus	Dim.	0	Dim.	Normal left ++ right	0
Disturbances of Rectum & Bladder	0	+	Dim.	Dim.	None
Trophic-Changes	0	0	0	Slight	Not noticeable
Babinski	+	+	+	0	0
Oppenheim	+	+	+	0	0

pubic cystotomy and closure without drainage. The wound healed by primary union. He was discharged from the hospital in good condition.

Treatment.—This consisted mainly in cleanliness and posture to prevent bedsores, cystitis and pneumonia. Urinary antiseptics were given. At first he was catheterized every eight hours. Later, an indwelling catheter was inserted. A pillow was placed under the knees. The feet were kept at right angles to the legs. A cradle supported the bedclothing over them. Massage

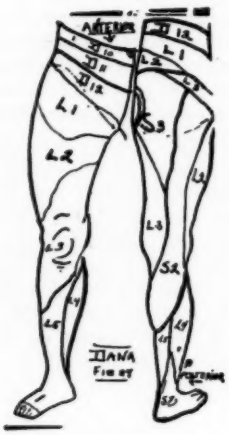

Fig. 1

Fig. 2

and passive movements were begun three weeks after the onset.

Diagnosis.—Acute infective myelitis (transverse); urinary calculi.

Differential Diagnosis.—The differential diagnosis from: (1) *tumor of the cord* is made by the history of preceding infection, the acute onset and the rarity of tumor in youth; (2) *poliomyelitis* because of the presence of a complete transverse lesion with motor and sensory involvement; (3) *simple hemorrhage* with compression by the absence of any history of injury; (4) *Landry's paralysis* by the present of fever and anesthesia, and also by the fact that there was no sphincter control here; (5) *multiple neuritis* of pernicious or hemorrhagic type by the fact that there were few sensory prodromal symptoms. Also, the hips and trunk were involved and these usually are skipped in multiple neuritis. Further the involvement of the sphincters, the complete cutaneous anesthesia below a definite level do not coincide with a diagnosis of multiple neuritis.

An explanation of the symptoms on a pathologic basis is presumptive because the patient recovered. Bell[1] defines a transverse myelitis as one "which is limited to from one to four segments of the cord and which involves the transverse area of the cord within these limits more or less completely." We can assume, first, that the origin was infectious and hematogenous, due to the history of previous scarlet fever and virulent infection following vaccination.[2] Anatomically it is known that the lumbar cord is more vascular than other portions.[3] Below the level of the second dorsal root, the branches supplying the cord are derived from the thoracic and abdominal aorta. According to Dana,[4] at or a little below where the blood supply changes from the subclavia above the heart, to the aorta below, transverse myelitis frequently occurs. Both peripheral and central arterial systems are made up of end arteries. Neither of them, however, are distributed in accordance with anatomic relations or physiologic functions. Each cell group has a vascular supply from various sources.

In order to account for the rather sudden complete transverse lesion with subsequent recovery, one must assume that the initial invading infectious agent was small, but of marked virulence. Further, it must be remembered that the patient was youthful. Therefore, with a minute focus, implanted in a vascular area, in a patient fourteen years of age, one would expect a marked local reaction. The latter occurred in the form of a cellular exudate and, more important, a marked edema. The progression and regression of this compressing fluid seems a logical explanation of the course of the disease in this case.

The patient as now seen, two years later, shows no demonstrable functional disability. He has noticed no weakness in the involved area and sensation is normal. From personal observation, it seems that development in the involved areas has kept pace with that elsewhere. He occasionally experiences a quick involuntary muscle jerk. There is no appreciable muscle atrophy. All former evidences of cord lesion have disappeared.

Summary.—

This case is of interest because of: (1) The evident infectious origin; (2) the marked reaction to bacterial invasion causing a complete transverse lesion; (3) the subsequent formation of multiple vesical calculi; (4) because acute transverse myelitis with functional recovery is rare.

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PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SURGERY

SUPERVISORS:
DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

THE TREATMENT OF TETANUS: Samuel Oscar Freedlander (Ann. of Surg. 85, 1927, 405-409). Twenty-five consecutive cases of tetanus are reported. These were treated uniformly and the results analyzed. It is generally agreed that antitoxin is the only measure which has thus far offered any hope of success in the treatment of tetanus. The gross mortality rate in pre-serum days, that is before 1896, was 75 to 85 per cent. Since the use of antitoxin has become widespread and especially in recent times when large doses have been used, the reports of tetanus cases show a lowered mortality rate. The inverse relation of the incubation period to the mortality rate has long been known, the longer the incubation period, the lower the death rate.

When prophylaxis does not prevent tetanus it has the effect of prolonging the incubation period and also increases the incidence of local tetanus, both of which reduce the gross mortality rate.

In the series reported the wound was treated locally by removal of all devitalized tissues and the injection of a small amount of antitoxin around it. Within the first twenty-four hours, a total of 50,000 to 150,000 units of antitoxin was given intravenously, divided into three to five injections, and thereafter a daily dose of 15,000 to 150,000 units was given in from two to three injections. Morphine was given every six hours hypodermically, and chloretone every six hours by rectum.

The aim of the treatment should be to maintain a high concentration of antitoxin in the blood in order to neutralize whatever toxin is already there and also that which is being given off from the focus of infection. Thus the toxin would be neutralized before being taken up by the nerve endings. Intra-spinal injections, he believes, have no advantages over intravenous ones.

The gross mortality rate was 36 per cent. In the eleven cases with an incubation period of less than ten days, 45.5 per cent died; in the eight cases with an incubation period of over ten days, 12.5 per cent died. Six patients died within the first twenty-four hours after admission to the hospital. If we exclude these, the mortality rate would be only 12 per cent. He believes that this relatively low mortality rate adds to the impression that tetanus antitoxin given in large doses has some therapeutic value. He concludes that it is probably not necessary to continue the use of the antitoxin longer than six or seven days.

HAROLD E. SIMON, M.D.

CONGENITAL ATRESIA OF THE ESOPHAGUS WITH ESOPHAGEAL DIVERTICULUM AND TRACHEO-ESOPHAGEAL FISTULA: Herbert H. Holderman (Archives of Surgery, 1927, 14, 917-920). Two hundred and seventeen cases have been reported in the literature and the author reports an additional one. This apparent rarity is probably due in part to failure in diagnosis.

The trachea and larynx are developed as an outgrowth from the entodermal alimentary canal. The first step in the development of the pulmonary system is a pouching of the ventral wall of the esophagus throughout its entire length. This groove deepens until its edges meet and fuse to form a separate tube, which later bifurcates. The trachea is the elongated stalk of the pulmonary system. Interference of mesoderm with entoderm at the junction of the trachea with the esophagus explains the causation of fistula.

The case reported was a baby girl who developed attacks of cyanosis. She would not take nourishment and there was considerable mucus in the mouth and throat. On fluoroscopic examination, barium milk mixture did not enter the stomach but collected in a pouch-like enlargement of the esophagus which extended down to third rib anteriorly.

A diagnosis was made of congenital atresia of the esophagus with a diverticulum and a gastrostomy was performed but the patient died. At necropsy this diagnosis was confirmed and a fistula was demonstrated between the esophagus and the trachea, accounting for the spells of cyanosis.

HAROLD E. SIMON, M.D.

THE TREATMENT OF ACID AND ALKALI BURNS: Edward C. Davidson (Annals of Surgery, 1927, 85, 481-489). Although acid and alkali burns of the skin are of frequent occurrence, the treatment of such lesions has not received the critical attention which it merits. The skin is protected by a resistant horny layer of cells whose vulnerability is further lessened by its normal oily secretion.

Acids and alkalies produce changes in the tissue which are similar to those caused by heat. The former may be progressive while heat burns are more or less self-limited.

There has been a difference of opinion regarding the efficacy of neutralization in contradistinction to simple dilution with water.

In his experiments, the author used rats, exposing them to different alkalies and acids in different concentrations for variable periods of time.

The results of the experiments were quite uniform. In every instance the rats which were washed thoroughly with water survived longer than those which were treated by neutralization, and the local lesions at any given period after exposure to the caustic revealed less evidence of irritation than those which were treated by neutralization. The striking difference in the results of treatment by the two methods may be due to the additional trauma of heat of neutralization. Heat of dilution must also be considered, but when running water or a large amount of water is used, this heat is promptly carried away.

No experiments were made to determine if any further improvement could be obtained by neutralization of any of the acid or alkali which may still be present after vigorous washing, but its dilution is so great that it is problematic whether it can cause further tissue injury.

HAROLD E. SIMON, M.D.

TREATMENT OF INFECTIONS OF THE FACE: John W. Price, Jr. (Annals of Surgery, 85, 1927, 329-332). The treatment of infections of the nose, upper lip and face differs from the treatment of other infected areas on account of the anatomy of these parts. From these infections bacteria readily enter the facial veins, which have no valves, thence to the ophthalmic vein and the cavernous sinus; or via the pterygoid plexus to the cavernous sinus, or may pass from the facial vein to the external jugular.

The serious nature of these lesions was recognized 74 years ago, and later autopsies have shown that patients dying with facial infections showed thrombophlebitis of the facial and jugular veins, thrombosis of the cavernous sinus, septicemia, pyemia and lung abscess.

The author reports six cases and discusses the treatment, which may be outlined according to the degree of infection. First, the initial lesion; second, the period of extension; and third, the period of thrombophlebitis, embolism or septicemia.

First stage. The initial lesion is usually confined to a hair follicle, sebaceous gland or sweat gland. The treatment consists largely of "don'ts"—don't squeeze, pick or cut. Apply alcohol or mercurochrome every hour, and when definitely localized the necrotic area may be opened with safety.

The second stage develops when localization fails to occur and the infection invades the neighboring hair follicles and glands and a carbuncle is developing. If it has been opened there is almost no discharge and a small gray slough may be visible. Early incision, squeezing and probing not only fails to give relief but causes a further rapid spreading of the infection. The treatment consists in measures to build up general resistance and in local measures. During the first few days the one or more necrotic points are kept open and small wet compresses applied constantly. When the process has become localized, small multiple incisions may be made to connect the multiple openings toward the center and the compresses continued as before.

When seen in the third stage the prognosis is usually hopeless. Intravenous injections of gentian violet and mercurochrome have been suggested and general measures should be carried out.

HAROLD E. SIMON, M.D.

END-RESULTS OF CHOLECYSTOSTOMY AS SHOWN BY THE CHOLECYSTOGRAM: Roy G. Spurling and Lester R. Whitaker (Surg., Gynec. and Obstet., 1927, 44, 463-467). Cholecystograms by the intravenous injection of sodium tetraiodophenolphthalein were made on twelve patients whose gall-bladders had previously been drained. The interval elapsing between the operation and the cholecystography varied from 25 days to 19 years.

None of the twelve patients had normal gall-bladder shadows. Four showed a recurrence of calculi as proved by a second operation and two more showed markedly thickened, sclerotic gall-bladders.

Animal experiments were undertaken to determine just what part of the pathological process is responsible for any alteration in the cholecystogram. In some animals the gall-bladder was opened and curetted and then closed with or without drainage. In others, the entire mucous membrane was removed. Cholecystograms were taken at intervals after operation.

The results of the experiments indicate that the mucous membrane is the necessary factor for the concentration of the dye in the gall-bladder. The emptying of the gall-bladder after the ingestion of fat was also inhibited, due to injury to the musculature.

In conclusion it would seem that the drainage of a diseased gall-bladder with the expectation that it will regain its normal function is not only a futile procedure but one that endangers the future health of the patients.

HAROLD E. SIMON, M.D.

PEDIATRICS

SUPERVISORS:

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ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

CLINICAL NOTES IN A SERIES OF PREMATURE INFANTS: Louis Fischer, M.D. (Archives of Pediatrics, April, 1927). One of the most difficult problems in infant feeding is the management of the premature. The continuous inhalation of oxygen night and day was one of the most valuable therapeutic agents in this condition. It is difficult to express an opinion in the premature infant under four pounds, as to whether transfusion should be a routine procedure or not.

At the end of the third week, a premature infant received seven ounces of breast milk in 24 hours and, owing to the stationary weight, karo 1 dram was added to each feeding. By increasing this carbohydrate the child gained two ounces in a week.

The transfusion of the whole blood was the important factor that aided nutrition and helped to metabolize the food in one case. The circulation improved; the cyanosis disappeared; the appetite increased.

The addition of four doses of insulin aided metabolism to such an extent that the author noted a gain usually at the end of one week but in most cases at the end of two weeks. Another symptom noticed with a series of cases of atrophy was an increase in appetite when insulin was ordered. One must individualize and study the case before deciding on a given feeding.

The protein tolerance and especially the fat tolerance was different in most infants while the carbohydrate tolerance was usually excellent.

R. N. ANDREWS, M.D.

THE CRYING INFANT: Samuel Allison Rose, M.D. (Archives of Pediatrics, 1927). 1. *Hunger.*—In breast-fed infants, weighing before and after each nursing for a whole 24 hours must be the rule. If the amount taken in comes below or just above the bare minimum expected, complementary feeding should be instituted.

2. *Indigestion.*—In the breast-fed, this is apt to be due to high fat content. This is the type of child that cries one to two hours after nursing. Here diluting the breast milk with water given before the nursing or diluting the expressed milk in a bottle will often remedy this disturbance. In the bottle-fed, either the fat or carbohydrate is usually at fault.

3. *Thirst.*—It is remarkable how many mothers are astounded by the information that their offspring get thirsty and want water. This lack of water is more prevalent in breast-fed than in bottle-fed babies.

4. *Excessive Warmth.*—Swathing the infant or maintaining a high temperature in the room, or both, because of the fear of the child catching cold, is responsible for more fussing and fretting than is commonly credited.

5. *Bad Habits.*—The process of "spoiling" is the attempt of the solicitous mother or nurse, without determining the cause of the discomfort, "to do something" for a baby that is crying. After a time a vicious cycle is set up.

6. *Nervousness.*—There is a small but troublesome class exhibiting the symptoms grouped under nervousness. Very frequently nothing but the installation of a sympathetic, intelligent nurse in the place of the worrisome, panicky mother is the only means of alleviation.

R. N. ANDREWS, M.D.

STUDIES ON EXPERIMENTAL RICKETS: E. V. McCollum, Ph.D., Sc.D., Nina Simmonds, Sc.D., J. Ernestine Becker, B.S., and P. G. Shipley, M.D., (Amer. Jour. of Diseases of Children, February, 1927). The numerous studies on the dietary properties of milk have established the fact that vitamins A, B and C, when present in the diet of the lactating female, pass readily into the milk

It is clear from experiments that the diet of the pregnant and nursing mother is of paramount importance in determining the quality of milk which she will produce. The authors have demonstrated that when female rats are fed cod liver oil before mating, during pregnancy and during the first two weeks of nursing—that is, the little rats themselves did not eat of the cod liver oil ration—the young are afforded an easily demonstrable protection against rickets.

It is also demonstrated that even though the mother and young take a diet which induces excellent growth, fertility and the rearing of a large majority of the young, that is, one containing satisfactory protein, mineral content, vitamins A and B and a small amount of vitamin D, it does not necessarily induce sufficient vigor in little rats to enable them to withstand the effects of a severe rickets-producing diet.

Provision of a diet which is so constituted as to insure good quality of the mother's milk, including a considerable amount of the antirachitic vitamin D, will tend markedly to safeguard the vitality and development of the young during the early weeks of life. The prevalence of rickets among both breast-fed and bottle-fed infants may in part be due to the unsatisfactory condition of the expectant and nursing mother brought about by an unwise selection of food. It seems justifiable, therefore, to insist on the importance of the expectant mother and the nursing mother taking suitable amounts of cod liver oil, as well as the importance of giving it to the infant.

It is not to be expected that a pale, anemic, frail woman, whose vitality has been undetermined by faulty living, should be successful in trying to build herself up by a dietary reform early in pregnancy. It is much easier to maintain than to regain health.

R. N. ANDREWS, M.D.

CHOREA—A Brief Clinical Study with Special Reference to the Use of an Immune Serum: Jesse R. Gerstley, M.D., with the assistance of L. J. Wilhelmi, M.D. (Amer. Jour. of Diseases of Children, April, 1927). It is not the authors' purpose in this article to support or to refute the idea of the streptococcic origin of chorea; the argument would readily be raised that the organisms they obtained from cultures of the nasopharynx were not the true organisms of chorea. In view of the foregoing observations and the lack of any evidence of really severe infection in any of the series, however, one is almost tempted to advance the hypothesis that there are two kinds of chorea, one of definite infectious origin and another due to the overtaxing of a predisposed nervous system through overwork and overstudy. At any rate, their studies have proved definitely the following:

The monovalent serum in its present form is of no clinical value in the treatment of chorea.

There is great variation in the types of streptococci produced from cultures by ordinary methods in the throats of patients having chorea.

A monovalent serum prepared by the use of the Rosenow chorea streptococccus in not absolutely specific but does agglutinate other types of streptococci.

Tonsillectomy apparently did not have any influence on the course of the disease or on the development of recurrences, though the authors are not prepared to state its influence on the development of complications.

R. N. Andrews, M.D.

GONORRHEAL VULVOVAGINITIS IN THE YOUNG: Stephen A. Yesko, M.D. (Amer. Jour. of Diseases of Children, April, 1927). Vulvovaginitis in the young results from indiscriminate contact with adults.

On account of the extreme contagiousness of the disease, it is difficult to control.

The microscope is the essential part of every diagnosis.

The attitude of the physician should be one of help and education.

Successful results depend not so much on the kind of medicament used as on the method pursued.

Daily instillation of some form of gonococcide by the physician or nurse and frequent cleansing by the mother are the best forms of treatment.

R. N. Andrews, M.D.

PHOSPHORUS IN RICKETS

The reports in regard to the efficacy of elementary phosphorus in rickets are surprisingly contradictory. Experiments have been carried out, however, which show that elementary phosphorus has no significant healing potency in rickets. (Jour. A. M. A., Dec. 18, 1926, p. 2094.)

ROENTGENOLOGY

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THE PRESENT STATUS OF CHOLECYSTOGRAPHY AND REMARKS ON THE MECHANISM OF EMPTYING OF THE GALL BLADDER: Graham (Surg., Gynec. and Obst., Feb. 1927). Cholecystography has reached its third birthday. During this time it has attracted wide attention, both in America and abroad. Both the intravenous method and the oral method have been popularized, and both have been found very reliable, with a higher diagnostic accuracy, however, being attributed to the intravenous method. A tabulated summary of the results obtained by leading observers is presented.

The phenoltetraiodophthalein has been used by the author in his most recent series of cases, and a lower toxicity is attributed to it as compared with its isomer, tetraiodophenolphthalein.

Cholecystography has likewise provoked a very animated search for the mechanism of emptying of the gall bladder. This work consists of further careful studies of the anatomy of the gall bladder, the bile ducts, and of the sphincter of Oddi, and of functional studies in man and in the laboratory animal. Whitaker has demonstrated that intrinsic contractions of the gall bladder do occur, but this has not been proven to be capable of emptying its contents. The author's own investigations and those of his co-workers substantiate his previous assertion that "the gall bladder empties itself of its contents through the cystic duct by the washing out of its contents by bile from the liver, by the elasticity of contractile mechanism of its walls, and by variations of intra-abdominal pressure." He concedes that, in the light of the newer evidence, a larger rôle might have to be ascribed to muscular contraction.

Walter H. Ude, M.D.

MALIGNANT TUMORS OF FATTY TISSUES: Seids and McGinnis (Surg., Gynec. and Obst., Feb., 1927). A fairly extensive review of the literature has been made, and five additional cases of liposarcoma are reported. Very often lipomata found in the retroperitoneal and intermuscular regions pursue a definitely malignant course, recurring as fibrolipomata or liposarcomata. Occasionally subcutaneous lipomata manifest the same tendency. The highly malignant nature of these tumors is not properly appreciated. They should be dealt with radically, as in the case of other malignant neoplasms, by thorough extirpation followed with *x*-ray.

Walter H. Ude, M.D.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE INTERNATIONAL MEDICAL ANNUAL. A year book of treatment and practitioner's index. 45th year, 1927. Cloth, $6.00. 560 pages. Illus. New York: William F. Wood & Company, 1927.

DISEASE OF THE SKIN AND SYPHILIS. Albert Strickler, M.D., Professor of Dermatology and Syphilology, Temple University, Department of Medicine, etc. 689 pages. Illus. Cloth, $8.00. Philadelphia: F. A. Davis Company, 1927.

HANDBOOK OF DISEASES OF THE RECTUM. 4th edition, revised and re-written. Louis J. Hirschman, M.D., F.A.C.S. Price $6.50. St. Louis: C. V. Mosby Co., 1926.

As stated by the author in the preface to the first section this is a working handbook of the more common diseases of the rectum and anus, more particularly for the busy general practitioner. Years of experience, together with a respect for both the patient's feelings and tissues, have rendered Dr. Hirschman especially well qualified to give advice on a subject which is usually passed over all too lightly.

Following a short chapter on anatomy and one on symptoms, comes the first important part of the work, explaining and emphasizing the various examination procedures. Instruments, position and methods of examination of the various rectal and sigmoidal conditions are given in detail and fully illustrated.

Local and sacral anesthesia are dealt with, including the use of novocain and quinine urea hydrochloride. The technic of sacral anesthesia is shown by a series of excellent cuts. The use of local anesthesia in minor office procedures is given fully.

Constipation, obstipation and fecal impaction are dealt with from the standpoint of physiology of defecation, etiology, and treatment, and illustrated by a series of *x*-ray photographs.

The chapter on pruritus is rather brief when one considers the aggravating persistence of the condition, and yet, its relative infrequency compared with the other more common maladies taken up, possibly does not warrant more space. Suggestions are given as to topical applications, and also several illustrations of the various surgical methods of effecting a cure, most of which are modifications of Ball's operation.

Anal fissure, ulcer, and abscess of the ano-rectal region are well described and exceptionally well illustrated with drawings and photographs. The many types of fistulæ, their diagnosis and treatment are shown by clear cut diagrams, drawings and many actual photographs.

The subject of hemorrhoids quite legitimately occupies more space than any other single subject. The various operative methods are described and shown by drawings which render them readily understandable, and the injection treatment is given in detail.

Polyposis, papillitis and cryptitis are dealt with in the next chapter. There is a short chapter on sigmoiditis and then follows lengthy discussion of dysentery by Jelks, listing the various types and measures for their relief. The last chapter is on prolapse of the anus and rectum.

The outstanding feature of the book is the illustrations, which are numerous and extremely good. The subjects are dealt with briefly, since it is, as its name shows, a handbook, but in a manner which makes it easy to read and easy to remember. It is a work which should be exteremely valuable to anyone doing general medicine or surgery.

HAROLD E. HULLSIEK, M.D.

THE CULTS. Annie Riley Hale. $2.00. New York: National Health Foundation, 1926.

To see ourselves as others see us is never entirely pleasant but when the reflected image is untrue and distorted it gives us real offense. Here the medical profession is shown as it appears to exponents of medical cults by Mrs. Hale, who admits that she attacks allopathy because it failed to cure her son. She promises to answer Morris Fishbein's "Medical Follies" but after asserting that homeopathy is not a cult, justifying osteopathy, chiropractic, Abrams electrical reactions and decrying vivisection, she wanders far afield and discourses upon Coué, Christian Science, medical publicity, state medicine and Henry Ford's Hospital, which she claims failed in its original purpose because it did not embrace diet and nature-cure.

In no uncertain terms the author denounces Morris Fishbein's personal appearance, the germ as the cause of disease, vaccination and the motives of medical men. She quotes, from various well known medical authors, statements about the low percentage of correct diagnosis and the inability of doctors to cope with many diseases, and asserts that cancer may be cured by proper diet. She further says, "Upon the basis of their own records and admissions the medical profession has created for the human race far more suffering than it ever relieved it of," and "The smug organization of doctor politicians known as the A. M. A. are playing a double leader rôle as guardians of the people's health and sales agents for the vaccine-serum interests."

This book is not an answer to "Medical Follies" in any sense of the word but is merely a fanatic's attempt to relieve her mind of a bitter grudge toward the medical profession. It is not worth shelf space or the few hours necessary for its perusal.

MARGARET WARWICK, M.D.

PRACTICAL MATERIA MEDICA AND PRESCRIPTION WRITING. Oscar W. Bethea, M.D., Ph.G., F.C.S. Fourth Revised Edition. Illus. 498 pages. Philadelphia: F. A. Davis Co., 1926.

This book is valuable as a reference book on drugs. There is a valuable chapter on prescription writing, but otherwise nothing any newer or better than can be obtained from any one of a hundred others.

WILLIAM W. MOIR, M.D.

THE PRACTICE OF PREVENTIVE MEDICINE. J. G. Fitzgerald, M.D., LL.D., F.R.S.C., Peter Gillespie, M.Sc., C.E., M.E.I.C. and H. M. Lancaster, B.A.Sc. 2nd edition. 792 pages. Illus. Cloth, $7.50. St. Louis: C. V. Mosby Company, 1926.

Beginning with the prenatal period, the author presents all subjects and conditions having any relation to preventive medicine even the problem of housing with its environment and legislation relating to the employment of children. Each topic is comprehensively and individually treated under its own heading. The book is well illustrated with pictures, charts and diagrams, and references are freely quoted.

In the chapter on communicable diseases the author emphasizes the necessity of early isolation of suspected cases until the diagnosis is positively made, also making all the recently discovered tests in diagnosis so that effective treatment may be instituted the earliest possible moment. Stress is laid on the danger from nose and throat discharges, from droplets spread by sneezing, spitting or coughing, or carried on the hands. The reference to infants and small children being infected by older children or adults arouses one's pity for these innocent victims.

Communicable diseases are divided into six groups according to the mode of transmission:

1. By secretions from nose, throat or mouth
2. By food or drink
3. By insect borne
4. By contact
5. By unknown etiology
6. By germs from the soil

Each disease is considered from the standpoint of incidence, etiology, modes of transmission and method of control, including the public health regulations ordinarily employed to prevent spread of the disease.

The chapters on water and milk include a description of normal constituents, analysis and dangers of contamination and infection, with instructions for purification. Examination is divided into five steps: (1) Physical, (2) biological, (3) chemical, (4) sanitary survey and inspection of the source and (5) epidemiological evidence.

The simple food supply of the primitive races is contrasted with our complicated foods. The constituents of a well balanced diet are given as well as the comparative number of calories required in the different occupations. The comparison is well brought out in a table which shows that the sawyer requires the greatest number of calories per hour of work, 476, while the seamstress requires but 86 calories per hour of work. The body loses energy in the form of heat and partly in the form of mechanical work. The exertion involved merely in sitting up requires extra metabolism of four calories per hour. Dietary deficiencies, besides causing certain diseases, result in various degrees of retardation of growth, as may be noted among the poor in the European slums. An example of insufficient energy in the diet was the "war edema."

Fatigue is one of the chief problems in industrial hygiene because it reduces, more than any other single factor, the efficiency and is the greatest predisposing condition for actual disease. Workers suffering industrial fatigue may or may not feel tired but their capacity for work is steadily diminishing from day to day. The cause for fatigue is obviously complex. The chief measures adopted to prevent fatigue are (1) reduction in hours, (2) rest periods and (3) posture.

To one interested in any phase of the practice of preventive medicine there is valuable information put into interesting reading in this volume.

NELLIE N. BARSNESS, M.D.

MEDICAL DIAGNOSIS. For the Student and Practitioner. Charles Lyman Greene, M.D., Chief of Staff St. Luke's Hospital, St. Paul. Sixth edition. Cloth, $12. Pp. 1468, with 723 illustrations. Philadelphia: P. Blakiston's Son & Co., 1926.

This book has enjoyed six editions. Each edition has been a definite improvement over the preceding. This edition consists of 1468 pages. It covers thoroughly and completely the entire field of medicine and includes all the newest and latest means of diagnosis, simply explained so as to be easily grasped by the busy practitioner. The section on heart and heart diseases is particularly strong, nearly 400 pages being devoted to this important part of medical diagnosis. The book is splendidly illustrated with plates and diagrams which add much to the lucidity of the text. The book is margined throughout, in which the important items are placed in heavy print, making a rapid perusal possible, and still obtaining the essentials. This also makes it easier for an individual interested in only one part to get what he wishes in a short time.

One hundred sixty pages have been devoted to an index, which is most complete and also aids the reader in quickly reaching the information desired.

The author is to be commended on the completeness with which the subject is covered and upon the arrangement which makes it easy to obtain information rapidly. Charles Lyman Greene is professor-emeritus of medicine in the University of Minnesota and his knowledge of and intimate acquaintance with the practicality of each item contained in this splendid volume makes still more valuable its application to one's own clinical experience.

A. N. BESSESEN, JR., M.D.

FACTS ON THE HEART: Richard C. Cabot, M.D., Professor of Medicine and Social Ethics, Howard University. 781 pages. Illus. Philadelphia and London: W. B. Saunders, 1926. $7.50.

Dr. Cabot presents here a work of real merit, with many valuable and logical conclusions drawn from a vast and comprehensive fund of excellent material, but the reviewer is unfortunately disappointed with a statement on the opening page, "most heart disease is imaginary." Such a statement, with the certainly inadequate and unsatisfactory explanation appended, seems fraught with the possibility of lulling the honest practitioner who is examining a patient with an obscure

cardiovascular symptomatology into a sense of false security as regards disease of the heart, and in so doing may often prevent the careful consideration and observation of such a patient who may in reality be presenting himself with the earliest signs of cardiac damage, that stage which we so desire to recognize in all diseases. This impression seems to be in part traceable to the method Dr. Cabot has used in obtaining his material. It reflects the deductions of an analysis of pathological and clinical material from the post-mortem table to the beginning of his clinical records, in great part embracing terminal stages of disease predominantly, and giving little thought to those subjective symptoms as well as objective findings which would assist in early diagnosis.

The "facts" as Dr. Cabot presents them are clear and incontrovertible, if the limitations of their significance in early diagnosis are borne in mind. They are essentially statistical in character, and bring out many sources of error of omission or commission in physical diagnosis. They serve to call attention to many fine points in diagnosis which are of undoubted value, and to fix the reader's thoughts on the relative importance of the various cardiac disorders as a cause of death.

Dr. Cabot has here made a valuable contribution to our already large number of works on the heart, and great credit must be given him for the eminently successful accomplishment of so huge a task, a compilation well deserving the attention of the profession.

JOSEPH F. BORG, M.D.

GOOD LOOKS. Irwin Sutton, M.D. 100 pages. $2.50. Taft Building, Hollywood, California.

This attractive little volume is evidently intended to give scientific information to the feminine mind with its ever increasing interest in personal appearance. It is written by a dermatologist, former associate in dermatology in the Mayo Clinic and now located in Hollywood, so from both the nature of his specialty and his association with beauty he should know whereof he speaks.

The subject matter is good, what there is of it, but there are barely 86 pages of reading matter, which does not seem to be quite sufficient to justify a book at the retail price of $2.50. He briefly discusses the care of the skin of adults, old people and babies, the care of the scalp, the nails, the mouth and the body in general, even to directions for taking a bath. The "Alkaline Diet" and "Anti-Constipation Diet" are given, also chapters on Constipation, Douches and Syphilis with reasons for its treatment by a dermatologist. The last chapter is devoted to "Good Reading" and recommends further perusal of ten magazines, including "Hygiea" and ten books on diet, care of the body and syphilis.

Throughout the book the discussion is scientific, yet expressed in simple language easily understood by the laity, and many prescriptions for lotions, shampoos, and creams are given. For many of the latter, credit is given to friends practising in other cities. Also frequent advice is given to consult a good physician with reasons as to why it is best. The book will be of little interest to the reader who is a physician, but he may safely recommend it to his feminine patients, who will find in it accurate answers to the questions they usually ask of beauty parlor employees, and it may help to keep them from the clutches of the quacks and cults.

MARGARET WARWICK, M.D.

OSLER'S MODERN MEDICINE, Volumes I, II, III and IV, edited by Thos. McCrae, M.D. Philadelphia and New York: Lea and Febiger, 1925 and 1926.

This edition is a thoroughly revised and elaborated system based on the old standby originally published by Doctor William Osler. The various sections have been written by men of unquestioned ability in their particular fields and the volumes are the most complete and concise of any editions available.

HARRY OERTING, M.D.

FOUNDATION OF HEALTH. William Barnard Sharp, S.M., M.D., Ph.D. 245 pages. Philadelphia: Lea and Febiger, 1924.

This little work of 245 pages, was designed for pre-Medical and Junior College Students. It is admirably written in a concise, interesting, and instructive manner. At the end of each chapter is given a list of citations, for collateral reading.

In consider this a very valuable little book for teachers and students. Reading it is a pleasure, and studying it would not be a formidable ordeal, but it contains little of especial value to the Physician.

J. C. WHITACRE, M.D.

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